Vol. 191 82nd Year No. 3506

# THE GAS JOURNAL

JULY 30, 1930

## A Glance at the Contents—

**Two Posts at Birkenhead.**

As will be seen from our advertisement columns, applications are invited for the position of Chief Chemist at a salary of £300. Candidates must have had a sound chemical training and experience on a modern gas-works. A Degree or an equivalent will be an advantage. Applications are also invited for an Outdoor Superintendent at a commencing salary of £420 per annum.

**Many Moons Ago.**

The "JOURNAL" eighty years ago contained a full report of a meeting of agitators at the Yorkshire Stingo, which was designed to reduce the price of gas in the Marylebone area. An amusing extract from the report of that meeting, the conduct of which could hardly be described as restrained and decorous, appears in our columns to-day.

**Recovery of Ammonium Chloride.**

The recovery of ammonium chloride from hydraulic main liquors is dealt with in the Report of the Chief Inspector of Alkali Works for 1929; and by permission of the Controller of H.M. Stationery Office we are able to give our readers an extract of that portion of the report which considers the problem. It is stated that, by simple evaporation, a crude salt only is obtained; but by acidification and evaporation by boiling of hydraulic main liquors at maximum strength, it is possible to recover ammonium chloride containing 1 to 2 p.ct. of higher phenols.

**New Gas Light and Coke Company Showrooms.**

On Wednesday of last week Mr. Will Thorne, M.P., opened a new Gas Light and Coke Company "service centre" in the Barking Road. This comprises fine showrooms, complete with demonstration hall and offices, and well equipped stores, which will be the headquarters of some 200 fitters who attend to all the needs of the 72,000 consumers in this East London district of the Company's area. The showrooms are on the usual attractively spacious lines.

**Bye-Product Coke and the Gas Industry.**

The important relationship between these two products is discussed by Mr. D. L. Jacobson, of the Koppers Company, Pittsburgh. The centralization of city gas production, the author concludes, into large bye-product plants capable of supplying a large area which may include a number of smaller cities is a step in the direction of economy and leads to the production of higher quality coke, gas, and bye-products. Such large central bye-product coke and gas plants are naturally supplemented by long-distance transmission lines carrying the coke oven gas under pressure to all parts of the long-distance distribution system.

**Distribution Engineer Wanted at Singapore.**

The Municipal Commissioners of Singapore require an Assistant Distribution Engineer for the permanent staff of their Gas Department. Applicants must be about 25 years of age and unmarried, and must have good practical knowledge of gasfitting, main and service laying, and general district maintenance work. The starting salary will be $4200, rising to $4800 at the end of the three years' agreement, and rising thereafter to a maximum of $8400 per annum. The exchange value of the dollar is 2s. 4d., at which rate the salary in the first year would amount to £490. For further particulars, see our advertisement columns.

**Alkali Works Report.**

The Reports of the Chief Inspectors of Alkali Works for 1929 are now available. Mr. W. A. Damon, Chief Inspector for England and Wales, mentions that there has been a drop of four in the number of tar works registered. This is due to the continued tendency of gas-works, especially the smaller undertakings, to join the co-operative concerns which aim at the centralization of tar distillation. Much trouble, he observes, has been caused, and great expense incurred, by reason of corrosion of tar stills, due, it is thought, to the presence of ammonium chloride. Attempts to remove the ammonium chloride by pre-steaming of the tar have met with a fair amount of success, and work is proceeding on these lines.

**Corrosion of Steel Mains.**

We publish to-day the concluding article by E. E. Jeavons, M.Inst.C.E., and H. T. Pinnock, M.A., F.I.C., who, as a result of their original researches, explain how electrolytic corrosion of steel mains may be prevented. The authors' 25 years' experience has led them to the conclusion that for the gas industry generally the safest, cheapest, and best method of distribution would be that in which steel mains, with welded joints, earthed at short intervals and carrying gas at high pressures are adopted; and the last ten years have shown that immunity from corrosion can be secured with steel mains, even in industrial areas where stray electric currents abound.

**Increasing the Gas Heating Load.**

Mr. C. S. Shapley, of Leeds, Mr. T. P. Ridley, of Newcastle, Mr. E. F. Keable, of Gorleston, and Mr. P. D. Walmsley, of Yarmouth, give their views (in our correspondence columns) on this subject. Attack is the best form of defence, says Mr. Shapley. "In formulating our plan of campaign we should be careful in our method, and make a point of being *pro* gas, and not *anti* electricity. We have a product which has stood the test of time, one we can be proud of, and one which can surpass competitors in the future, if properly handled." Mr. Keable outlines a system which he has adopted in his area of supply and which is giving excellent results. Mr. Walmsley urges education of the medical profession as to the virtues of the gas fire, while Mr. Ridley emphasizes the value of liberal local advertising, good service, and keen and enthusiastic employees.

**Dehydration by Compression.**

The costs of dehydration by two small compressing units are given by Mr. W. S. Dole, Gas Engineer to the Federal Light and Traction Company of New York City. One of these units deals with 91 million c.ft. of gas a year; the other with 193 millions. In each case the cost of dehydration works out at approximately 1½d. per 1000 c.ft. of gas treated. The compression method has the merit of simplicity; water vapour and naphthalene are removed in one operation. It has the disadvantage of a higher operating cost. However, this cost, states the author, may not be out of line if the gas is already being sent out at a pressure higher than that thrown by the holder. Another disadvantage is that in addition to the naphthalene some of the light oils are removed, with a slight reduction in the B.Th.U. values. This amounts to about 5 B.Th.U. per c.ft. in the case of a coal gas plant on a compression ranging from 30 lbs. to 50 lbs.

# EDITORIAL NOTES

## *Dehydration by Compression*

IT is not often that we hear much about dehydration by compression—a method which has the merit of simplicity, but which is dearer to operate and more costly to install than the absorption process, which has made such excellent progress during the last three years in this country. Consequently, a paper (published in later pages) which Mr. W. S. Dole, Gas Engineer to the Federal Light and Traction Company of New York City, read at the annual meeting of the Canadian Gas Association last month, in which he recounts his experiences of small compression units for dehydration, is most welcome. The author believes, and we believe too, that dehydration of gas will before long be general practice—first, because of the much better service which the consumer receives, and secondly because it brings profit to the supply undertaking. As the author remarks, two things are responsible for most of our distribution troubles—water and naphthalene; and dehydration does away with these two evils.

It would appear that the only justification for dehydration by compression as distinct from absorption is when the gas is sent out from the works at a pressure considerably higher than that thrown by the holders—in other words, where compression plant is in any case necessary. Not only is the compression process, as already mentioned, more costly to operate, but it removes, in addition to the naphthalene, a certain amount of light oils, equivalent to a reduction of about 5 B.Th.U. per cubic foot on a compression ranging from 30 to 50 lbs. per sq. in. However, there may be instances when the attractions of the process are such as to warrant its installation; and the figures which the author gives of the capital costs and working charges of two small units at present in successful operation are sure to be of interest to our readers.

The two plants to which Mr. Dole refers are at Albuquerque (New Mexico) and Tucson (Arizona). The former, which commenced work in 1927, is located on the outlet side of the storage holders, and it deals with 91 million c.ft. a year. Compression is carried from 30 lbs. to 50 lbs. When the latter pressure is reached, the compressor automatically stops until the pressure drops to 30 lbs., when it automatically starts up again. A governor at the outlet of the storage tanks (these consist of old boilers) reduces the outlet pressure to 8 in. of water. This installation cost, roughly, £2885. In 1928, the cost of dehydration was £588; the cost per 1000 c.ft. of gas treated being approximately 1½d. At the same time, savings due to such items as reduction in costs of syphon-pumping, maintenance of mains and services, &c., amounted to £916. In other words, the dehydration process saved £328 in that year, a figure which does not take into account interest on capital.

The plant at Tucson treats oil gas of 500 B.Th.U. per c.ft., and in 1929 dealt with 193 million c.ft. This unit cost £4287; the cost of dehydration last year was £1144; and the author gives the saving attributable to the plant as £1080. In 1929, then, there was a small loss—which, however, it is stated will be transformed into a profit this year. Both plants ensured better service to consumers and reduced the figure for unaccounted-for gas; and the cost of dehydration was the same per 1000 c.ft. of gas—viz., 1½d. Without knowing to what extent the dehydration was carried (it may be mentioned in this connection that at Albuquerque, though the climate is in general comparatively mild, with no long-continued spells of severe weather, the thermometer has been known to touch zero, and reaches 100° once in a while during the summer) it is impossible to draw any proper comparison between the costs of dehydration by compression and those of dehydration by absorption. We would, however, call attention to Dr. E. W. Smith's figures before the Institution of Gas Engineers last June. With the calcium chloride process, he said, the range of costs is from 0·22d. to 0·72d. per 1000 c.ft., depending on the size of the installation—costs which are negligible when compared with the savings consequent on dehydration, to say nothing of better service to the consumer. Compression methods, remarked Dr. Smith, "do not come into consideration except when the gas is to be distributed under pressure." The same idea is indicated by Mr. Dole.

## *The New Dictatorship*

PLAIN facts are forcibly set out in a letter issued to the Press by four Members of Parliament, and reproduced in this issue of the "JOURNAL;" the subject being the desire of certain local authorities to compel tenants of their houses to employ a particular form of heating, cooking, and lighting. Compulsion of this character represents a form of dictatorship which cannot appeal to lovers of fair play, and we hope, with the signatories, that a determined stand will be made against it. Even from the point of view of the local authorities themselves, the policy may eventually turn out to be a bad one; for council houses may not always be in such demand as is the case now, and should that time arrive the limitation imposed would be distinctly unfavourable to them.

When the matter was discussed in Parliament recently—with the disappointing result announced in our columns a fortnight ago—it was urged that the time had not yet come when people should be dragooned by a municipality into doing things which they did not want to do. It would be better, in a law-abiding community, that this time should never come. The Minister of Health (Mr. Arthur Greenwood) said in the House that the struggle was one between public enterprise and private enterprise, but this appears to us to be an incorrect interpretation of the position. It should be said rather that the matter is one of broad principle; for the real point at issue is no less than the liberty of the subject. We would therefore once more express the view that the matter is one of which sight should not be lost by the gas industry, who should on every appropriate occasion emphasize the unfairness of binding tenants in the way that a number of local authorities are doing.

## *Earth Bars*

FOR twenty-seven years Mr. E. E. Jeavons and Mr. H. T. Pinnock have been studying the electrolytic corrosion of steel mains, and they claim to have found a remedy to the expensive action of stray electric currents. With the experience of over a quarter-of-a-century behind them, the authors are convinced that, with steel mains properly bitumen-coated, and earthed, there is now little or no danger from electrolytic corrosion if their method of procedure be adopted. The reasons for this conclusion form the subject of two articles, one of which was published in the "JOURNAL" last week, and the other of which will be found on later pages of our issue to-day. Adding to the immunity from corrosion the unbreakable quality of steel mains, the authors are of opinion that more and more of this type of main will be laid as time goes on. This, they say, is especially the case in view of changing circumstances, not only in the actual distribution of gas, but in the new road-traffic conditions, with the resultant dangers of vibration.

There are three main recommendations. First, the greatest care should be taken to ensure a coating as perfect as possible; secondly, earth bars fitted in good electrical contact with the main should be attached at intervals of about half-a-mile, and sunk to such a depth as will ensure permanently moist ground for the bars; thirdly, where the gas main is not continuous electrically—*i.e.*, has not welded joints—copper bonds should be placed over every joint. The authors set out clearly how the bonds and the bars should be fitted. Steel bars 2 in. by

⅜ in. by 20 ft. are employed, and they are protected at the main, after fixing, by insulated coating.

Proof is cited of the efficacy of earthing mains according to the prescription given by Mr. Jeavons and Mr. Pinnock. Excessive corrosion of the steel mains led the South Staffordshire Mond Gas Company to adopt the earthing system in 1918. About two hundred earth bars were inserted, and all functioned as predicted. The bars are being eaten away gradually, but the corrosion of the mains themselves has been almost stopped, and the Company are now satisfied that the danger from electrolysis has practically disappeared. The authors' experience has led them to the conclusion that for the gas industry generally "the safest, cheapest, and best method of distribution would be that in which steel mains, with welded joints, earthed at short intervals and carrying gas at high pressures were adopted; and the last ten years have shown that immunity from corrosion can be secured with steel mains, even in industrial areas where stray electric currents abound." It is because the practical results obtained in preventing corrosion of steel mains have been so satisfactory that we publish the articles in the hope that those interested may reap some benefit from the authors' experience.

# *Private Bill Procedure*

Among the many changes which have come about during recent years must be included the decline of interest of the gas industry in Parliamentary Committee Room proceedings. Time was when never a year passed by without its record of keenly fought battles; to-day we manage things differently. Even now, however, there are a certain number of Bills promoted each session by gas undertakings, so that it is not out of place to draw attention to the conclusions of a Select Committee appointed to consider and report whether any alterations are desirable in practice and procedure with a view to facilitating proceedings on Private Bills and lessening the expense at present incurred. The inquiry was a full one, and should lead to tangible results.

There is, for example, the suggested modification of the present newspaper notices, "which are in many cases inordinately long, and may contain proposals not subsequently included in the Bill." The Committee's view is that the deposit of the Bill should precede the publication of the newspaper notices, and that the latter, besides indicating where the Bill can be inspected and purchased, should "contain a concise summary of the purposes of the Bill, but without detailed particulars, and without any reference to provisions of an ancillary, subsidiary, or consequential nature intended to give effect to any such purpose." This change should not press hardly upon potential opponents, and it might even prove an advantage to them if the shortening of the notice permitted the use of somewhat larger type than is now customarily employed for the purpose. The shortening of the "Gazette" notices is also recommended; and here, again, it is not easy to see why public hardship should ensue.

Changes in procedure are discussed by the Committee in their report, and a large section is devoted to the all-important question of expense. In connection with printing, &c., they put forward several recommendations; attention to this matter being explained by the fact that, analyzing a number of instances, the cost of printing is shown to represent about 25 p.ct. of the total cost of Private Bill legislation. This is, of course, partly accounted for by the fact that so much of the work has necessarily to be done at night.

A further recommendation is that the appointment of the Local Legislation Committee should be discontinued. Under the present system, Bills promoted by local authorities, whether opposed or not, by which it is proposed to create powers relating to police, sanitary, or other local government regulations, at variance with the provisions of the general law, are referred to this Committee. The original intention in setting up the Police and Sanitary Committee, the predecessor of the Local Legislation Committee, was to ensure that all Bills containing clauses of the nature alluded to should be considered by the same Committee. Tribute is paid in the report to the valuable work done by the Committee, but, for reasons set forth, it is felt that the cause of expedition and economy would be best served if it were not re-appointed.

Instances from time to time occur in which a struggle, after taking place in the Committee Rooms of one House, is resumed in the Committee Rooms of the other House; and one is tempted to wonder whether, in this event, there is scope for any changes aimed at non-duplication of labour, which might prove beneficial in the interests of economy.

# *Recovery of Ammonium Chloride*

Would it pay to recover ammonium chloride directly on a gas-works? This question is raised in the Sixty-Sixth Annual Report on Alkali Works; and by permission of the Controller of H.M. Stationery Office we are able to-day to give our readers an extract of that portion of the report which deals with the problem. Interesting work has been carried out in the laboratories of the Chief Alkali Inspector during last year; and the findings are set out on later pages. The suggestion is put forward that recovery of ammonium chloride is attractive in that it would not only relieve the ammonia stills and reduce the bulk of the effluent, but would effect economy by reason of the reduced liming necessary; also there would be a corresponding reduction in the consumption of sulphuric acid.

Particulars are given of the system operated by the Wombwell Coke and Bye-Product Company, Ltd., at whose works the crude gas is treated with a liquor spray and then passes through a cyclone, which is also provided with a liquor spray, the liquor in both cases running to a circulating tank. A third spray after the cyclone is supplied with fresh water, and this removes a further amount of ammonium chloride. Circulation is continued until the liquor contains about 15 p.ct. of ammonium chloride, when it is withdrawn for evaporation. The average recovery is 3 lbs. of ammonium chloride per ton of coal carbonized. Turning to gas-works practice, the report, having stated that probably a much larger volume of spraying liquor is sometimes used than is necessary, observes that the cost of evaporation of hydraulic main liquors for the recovery of ammonium chloride should not be too great, for waste heat could be applied to the process. As for the market, last year nearly 3000 tons of ammonium chloride was imported into Great Britain.

The laboratory investigation was concerned largely with the reasons why the salt produced darkened on exposure to light. This is due to the presence of higher tar acids; and of the common solvents only pyridine is capable of almost completely removing them. After extraction with pyridine, the salt is white, and contains 31·6 p.ct. of ammonia; no subsequent darkening occurs. By simple evaporation, a crude salt only is obtained; but by acidification and evaporation by boiling of hydraulic main liquors at maximum strength, it is possible to recover ammonium chloride containing 1 to 2 p.ct. of higher phenols.

---

### Education for Gas Salesmanship.

The Executive Committee of the "B.C.G.A." at their meeting on Wednesday, July 16, appointed a Sub-Committee to deal with the subject of "Education for Gas Salesmanship." That Committee is holding its first meeting to-day.

### If it Became Law?

What would be the result of the placing on the Statute Book of a Bill lately introduced to provide for the payment of compensation for the loss of employment? The principal clause provides that if employment is terminated for any reason other than serious and wilful misconduct, or the attainment of the normal retiring age where there is membership of a superannuation or pension fund, the employer shall pay to the employed person an amount in respect of each completed year of his employment equivalent to one-twelfth of the total remuneration paid during each completed year. In the event of the em-

ployment being terminated in consequence of the death, bankruptcy, or liquidation of the employer, the amount payable to the employed person would have priority to other debts. The result might be an increase in short-term engagements.

### Big Figures.

Quite a useful little bit of propaganda is put out by our contemporary, the "American Gas Journal," who print the following on the front of the envelope in which copies of the publication are despatched to subscribers: "Gas now serves over 70,000,000 people in the U.S.A."

### Low-Temperature Carbonization Association.

Announcement has been made in the Press of the formation of what may be termed a national organization for the firms who are actively engaged in the low-temperature carbonization of coal. The idea is that this new body will act as a representative Association in all negotiations with the Government, the mining industry, the Fuel Research Board, and other official Departments concerned, and will also take any other measures which will promote the interests of the industry as a whole. This is another example of the co-operative principle which is essential to industry to-day.

### What Do the Public Desire?

It is quite reasonable to assume that a community has the Press which it desires, even should there be sensational sections which make one wish to believe otherwise. In the United States, perhaps, the public have more decided views as to their requirements than is the case here, for the Publicity and Advertising Section of the American Gas Association state that: "Readers look to the newspaper for detailed information concerning the utility corporation's progress, its plans for expansion, its adoption of new methods of operation, its changes in executive personnel, its earnings, its rate changes, and its relationships with public service commissions and other public officials. The day when the public was satisfied with brief statements on important subjects affecting representative corporations has passed. Stock ownership, once in the hands of a few, has broadened out so that to-day thousands of persons of moderate means own shares in one or more public utilities. Many others are prospective stockholders, for the great progress made by utilities in recent years and the outlook for still greater progress in the light and power industry have stirred the public imagination to an appreciation of the probabilities of profit through partnership in one or more of these corporations. This broad ownership gives the newspaper readers' interest in public utility affairs a new importance, for it takes it out of mere curiosity and gives it force in that the reader desires information for the purpose of protecting money already invested, and for the purpose of investing profitably his newly accumulated savings. Therefore the newspaper must, as a matter of duty, strive to publish day by day all that has happened to affect the properties in which its readers have become partners."

### And How to Supply It.

The position outlined by the A.G.A. is much the same as here—stock ownership (largely through the operation of co-partnership schemes) has broadened out so that to-day thousands of persons own shares in one or more gas undertakings; and these people, it should be presumed, entertain a like desire to know all about the concerns. Is the eagerness of the newspapers to supply the news as great as in America? For this is what the Publicity and Advertising Section go on to say: "The newspaper believes that every such corporation should designate one of its officials to receive inquiries from newspapers. The newspaper would prefer that this information come from one source in the corporation. The official designated to maintain contacts with the newspapers should be a man of such ability and discretion that he could be trusted with all essential information concerning his corporation, so that his replies to newspaper inquiries might be genuinely informative. This contact official, being fully informed as to the plans of the corporation, could co-operate at all times with the newspaper to the advantage of all concerned—the utility, the newspaper, and the newspapers' readers. It would facilitate closer and better co-operative understandings among the newspapers and utilities if the official designated as the 'news contact' were also to direct the advertising. In this way points that might come into dispute could be adjusted quickly, and serious misunderstandings could be avoided."

## Forthcoming Engagements.

**Aug. 19 and 20.**—Irish Association of Gas Managers.—Meeting in Dublin.
**Sept. 8-11.**—Association of Public Lighting Engineers.—Annual Meeting and Conference at Leicester.
**Sept. 9.**—Federation of Gas Employers.—Meeting of the Central Committee.
**Sept. 9.**—National Gas Council.—Meeting of the Central Executive Board.
**Sept. 11.**—North British Association of Gas Managers.—Annual Meeting at Aberdeen.
**Sept. 18.**—Wales and Monmouthshire District Institution of Gas Engineers and Managers.—General Meeting at Porthcawl.
**Sept. 18.**—Society of British Gas Industries.—Council meeting in the afternoon.
**Sept. 26-28.**—National Smoke Abatement Society.—Annual Conference at Leicester.
**Oct. 10.**—Manchester District Institution of Gas Engineers.—Visit to the Manchester Corporation Gas-Works at Partington.
**Oct. 27 to 29.**—British Commercial Gas Association.—Annual Meeting at Hull and Bridlington.
**Nov. 19.**—Society of British Gas Industries.—Autumn general meeting in London, under the Presidency of the Right Hon. Lord Eustace Percy, M.P.

## PERSONAL

### CORBET-WOODALL SCHOLAR.

Our photograph is of Mr. Fred Bell, who, as already announced in the "Journal," has been awarded the Corbet-

Woodall Scholarship tenable at the Fuel Department of the University of Leeds. Mr. Bell received his general education at the West Leeds High School, and from there he obtained a position as Assistant Chemist with the firm of Wilsons & Mathiesons, Ltd.—a post which he held for twelve months, and vacated to take up duties as Assistant Chemist in the Laboratory of the Leeds Gas Department. He holds the Ordinary Certificates of the Institution of Gas Engineers in both Gas Engineering and Gas Supply. Mr. Bell has also been awarded a Leeds City Senior Technological Scholarship, which will run concurrently with the Corbet-Woodall Scholarship at Leeds University for three or four years.

Congratulations to Dr. W. Leopold, of Hamburg, who celebrated his seventieth birthday on July 16. For two years he

was Assistant at the Hygienic Institute of Münich, following which he had another two-year spell as Assistant to Dr. Bunte at the Münich Gas-Works. It was at this stage that he was appointed Chemist to the Frankfürt Gas Company—a position he occupied for nine years. He left to take up the post of Chemist at the Hamburg Gas-Works, of which for a period of fifteen years he was Director. He now lives in retirement at Hamburg. Dr. Leopold has published many papers on technical subjects, and for several years was Chairman of the German Insurance Association, which dealt with accidents to employees at gas and water works. We hope he will enjoy his retirement for many years.

Mr. F. H. Hollyhoke, for the past ten years Secretary of the Halesowen Gas Company, has resigned to take up a position with the Shropshire, Worcestershire, and Staffordshire Electric Power Company.

Mr. Alexander G. Grant, M.Sc. (Gas Engineering), Assoc.M.Inst.Gas E., at present with the Gas Light and Coke Company, has been appointed to the staff of the Whessoe Foundry and Engineering Company, Ltd., Darlington, as Chemical Engineer. Mr. Grant, at the recent meeting of the Institution of Gas Engineers, received the Bronze Medal for his paper on "Some Aspects of the Carburetting Process in Water Gas Manufacture." He was trained at Leeds University under Prof. Cobb, being awarded the Corbet-Woodall Scholarship on entry, and has been on the engineering staff of the Gas Light and Coke Company for the last four years.

Mr. A. Vincent Kemp, M.I.Mech.E., late Director of the Wellman Smith Owen Engineering Corporation, Ltd., has been elected to a seat on the Board of Gas Chambers and Coke Ovens, Ltd., of Artillery House, Westminster, S.W. 1.

## OBITUARY

The death is announced of Mr. William Webberley Hulse, of Longton. He was 73 years of age, and was for many years Manager and Engineer of the old Longton Borough Council's Gas-Works.

# CORRESPONDENCE

## *Liberty or Slavery?*

Sir,—It is imperative, in the opinion of the undersigned, that a determined stand shall be made against a new and impudent form of dictatorship that is exercised by certain municipal authorities over their tenants.

These authorities own electricity undertakings; and they are stipulating that occupants of municipal houses shall employ only electricity for heating, cooking, and lighting. Taxpayers' money is used to subsidize the building of these houses, and it is indefensible that taxpayers who rent them shall be compelled to use the form of heating, cooking, and lighting prescribed (and sold) by the local authority or forfeit their tenancies.

It is an axiom that the Englishman's home is his castle, and to dictate to him the kind of domestic services he shall employ is patently an infringement of the liberty of the subject which is symptomatic of modern tendencies of local government.

The matter also has an economic significance. Not only are householders compelled, in some cases, to employ a more expensive form of power, but this arbitrary elimination of competition ultimately may send up the price still higher. The grave problem which this dictatorship presents to the gas industry must not be overlooked, for it is estimated that restrictions have been imposed already upon no fewer than 80,000 houses.

It is essential in the public interest, therefore, that all householders shall have the right to decide for themselves in such fundamental matters in the conduct of their own homes.

C. Howard Bury.
Lymington.
R. A. Butler.
A. Vernon Davies.

*House of Commons,*
*London, S.W. 1,*
*July 19, 1930.*

## *Gas Fire Campaign.*

Sir,—As you point out in your editorial columns this week, our electrical competitors are in the field of heating; and with their slogan of "Plug in to Comfort" they are not waiting for gas undertakings to wake up.

Attack is the best form of defence. In formulating our plan of campaign we should be careful in our method, and make a point of being *pro* gas, and not *anti* electricity. We have a product which has stood the test of time, one we can be proud of, and one which can surpass competitors in the future, if properly handled.

It is essential that every gas manager should take steps to ensure that his employees are fully alive to present-day conditions. Only by instilling enthusiasm, team work, and efficiency into all his staff can he ensure success. Each and every individual can become a gas salesman in his own little sphere. Many mediums are at hand for furthering propaganda—namely, Press advertising, advertising by post, distribution of literature, special window displays, demonstrations, and canvassing. Full use should be made of each; and, to derive full benefit of the forthcoming winter, immediate action is necessary.

It is surprising how many erroneous ideas still exist not only among gas fire users, but also in the medical profession, and among architects. We can only overcome this prejudice by broadcasting the fact that *modern* gas fires are hygienic, and the healthy form of heating. House-to-house inspection has proved to us the necessity of driving home these facts, and, at the same time, of rendering the necessary service.

To combat the problem of the portable electric fire at the prices now available, I think the manufacturers should assist us by producing a gas fire which we can install at a much more reasonable figure. There is no doubt that some of the present-day prices of appliances are much too high.

Saturation point is a long way off. Do not overlook the following: Medical profession, architects and builders, hotels, boarding-houses, offices and business premises, cafés, &c., not forgetting the ever valuable private houses.

C. S. Shapley,
Gas Engineer and General Manager.

*Gas Department, Market Hall, Leeds,*
*July 25, 1930.*

Sir,—The article under the above title in your issue of July 23 is very timely, and directs attention to certain aspects which require repeating from time to time.

You ask your readers what are the difficulties which they experience in their districts, and the extent and nature of electrical competition. The greatest difficulty with which we have to contend is depression in trade, which has continued in this district for several years, with the prospect that during the coming winter it will be worse than ever before. The result is that the public will not, and in many cases cannot, embark upon any changes towards higher standards of comfort. We have, of course, also to contend with electrical competition aided by low tariff charges and portability of appliances. Our methods of combatting these difficulties are (*a*) liberal local advertising of the advantages of gas fires, (*b*) giving good service, including annual inspection and free maintenance of both privately owned and hired gas fires, and (*c*) all employees looking keenly for every instance where gas fires can be introduced, notwithstanding trade depression. What we want most is more general employment in the district; and we know that if we had this our annual increase in numbers of gas fires in use on the district would be greater than in recent times, notwithstanding the efforts of our competitors.

T. P. Ridley,
Secretary and Commercial Manager.

*Newcastle-upon-Tyne and Gateshead Gas Company,*
*33, Grainger Street West, Newcastle-upon-Tyne,*
*July 25, 1930.*

Sir,—The correct time to bring to consumers the advantage of gas fires is obviously before the actual need for heating arises. The early applicants must receive more careful attention, and these furnish our best source of advertisement. If we are to continue to expand in output, no stone must be left unturned; it must be hard working optimism all the time. Last season, gauging the force of our competitors, we instituted a gas fire campaign on the following lines.

Realizing that the price of gas for heating is the all-important factor, we selected as our campaign fire the "Mainscreen," because it is economical in use, and has distinct features of its own. As our slogan we used "Plug in your Gas Fire." We laid before our consumers, by circular letter, the advantages of gaseous heating of the fire in question; and this was followed up by a trained canvasser. Our local advertising for thirteen weeks was confined to the fire in question, and at the same time we had running at the largest cinema in our area a trick film entirely devoted to the subject. The fire was offered on simple hire for 1s. 6d. per quarter in black finish, free, and points were run to two fireplaces likely to be most frequently used. The fire in question lends itself to being carried from one room to another. It had attached a short

length of best-quality flexible tube by means of a Willey end, the other end of the tube having the plug-in attachment to suit the two special cocks fixed. The length of the tube allowed for the fire, when fixed, being central; and a short length of flue was screwed to the discharge nozzle of the fire to ensure that the products got away to the chimney.

We thus were able to offer a "plug-in" fire of excellent appearance, which in summer was a firescreen and in winter a heater; and if the consumer so desired, for a slight extra charge, the fire could be obtained in art finishes.

The response was very good, and unquestionably kept out a number of electric radiators; and the policy will be continued.

We are up against keen competition, but are holding our own; and I trust our experience may be of some service. You are to be congratulated on bringing this matter to the fore.

E. F. KEABLE,
Engineer and Manager.

*Gorleston and Southtown Gas Company,*
*Southtown, Great Yarmouth,*
*July 24, 1930.*

---

SIR,—I have read with great interest your suggestions for a Gas Fire Campaign for the coming heating season, with which, speaking generally, I am in agreement.

There is one aspect of this matter which you do not seem to have touched upon in your suggestions for educating the public in the use of gas for heating, and that is the influence of the doctor.

There are not many homes into which a doctor does not enter in the course of a year, and it is not too much to say that the doctor's opinions and suggestions are—and rightly so in the vast majority of cases—received with respect, and due heed is given to them. In fact, in many working and middle-class households the doctor's opinions and advice are received with what amounts almost to awe and reverence. How important, then, to have the doctor on our side, so that when he visits a sick room we may expect a conversation something like the following:

*Doctor:* You must have a fire, and must keep this room as nearly as possible at a temperature of so and so.

*Person in Charge:* Yes, Doctor, but how am I to do that with a coal fire?

*Doctor:* Well, why not have a small gas fire? You will have no difficulty then, and they are not expensive to install.

You mention in your leader that "there are thousands of people who do not appreciate that the gas fire is, among other things, the healthiest form of heating." Are there not many more thousands, Mr. Editor, whose conception of a gas fire is that of "an abominable thing which smells dreadfully, dries the atmosphere, causes sore throats, &c.?" and this conception is not confined to what one sometimes hears referred to as the "ignorant masses." Only a short time ago my attention was called to the fact that in a Girl's Secondary School in this town the Head Mistress instructing a class of girls in general knowledge emphasized that "wherever a gas fire is in use you must always have a bowl of water in front of the fire to counteract the drying effect of the fire, or you will have sort throats, &c." If such colossal ignorance as to the position of gas to-day exists in the minds of educated persons such as the one I have quoted above, what are we to think of the conception of the general public as to the amenities which gas can provide for them?

Again, dealing with our industry from a general standpoint, I was recently in the North of England. In conversation, a friend of mine said, "Well, W., I suppose you and the other gas undertakings throughout the country will be feeling very anxious as to your future now that everyone is cutting out gas and changing over to electricity." In further conversation with this friend, who was educated at a public school, I elicited the fact that he was of opinion that in a very few years the gas industry would be out of existence, and everything would be done by electricity. His astonishment when I expounded to him the true position was wonderful to see.

Such experiences as the above make one wonder where we stand with the general public, and if our advertising and schemes for the education of the public in regard to gas are really "getting there."

P. D. WALMSLEY.

*Great Yarmouth Gas Company,*
*Great Yarmouth,*
*July 25, 1930.*

---

# ON THE ELECTRICAL SIDE

### Goodwill.

Lieut.-Col. W. A. Vignoles, D.S.O., has been on a visit to America as one of the representatives of the British Electrical Development Association, and as the result of his observations, his colleagues on this side have received some useful information. At a recent luncheon which was attended by many representative members of the electrical industry, he told his hearers that, in trying to adapt U.S.A. methods for use in this country they could, he thought, profitably lay to heart the American method of giving as much attention to the scheme for selling their products as they do to the design of the plant for making them. The electrical supply industry in the States have realized that, for several reasons, it is desirable that the public should have confidence in the public utility companies, and they are therefore doing everything possible to cultivate good relations with their customers with a view to inspiring confidence, and thereby improving their sales, and also good relations with the general public. This, it need hardly be pointed out, is every bit as necessary in the case of the gas industry as in that of the electricians.

### Propaganda.

Another reference by Lieut.-Col. Vignoles was to propaganda. The importance of this, and the amount of work and money needed to make it effective, are evidently understood in the United States. In this country, he said, the only general co-operative development work is that carried out by E.D.A., but in America such labour devolves to some extent on the N.E.L.A., while the whole of the activities of the Society of Electrical Development, the various Electrical Leagues, and the recently founded Lighting Service Bureau in Chicago, are devoted to co-operative propaganda work. The N.E.L.A., who are now devoting most of their attention to commercial development and publicity work of some sort, are spending annually about one million dollars (£200,000), while it is estimated that a similar sum is spent in the aggregate by the Society of Electrical Development and the 35 active Leagues. Thus about £400,000 is being spent on co-operative propaganda work, while, as indicated, very large sums are spent by Sales Departments of supply undertakings. In addition, manufacturers are co-operating with the Society of Electrical Development in special campaigns, and are themselves spending very large sums in obtaining publicity for their own special products. Lieut.-Col. Vignoles had, in fact, heard on good authority that one manufacturer of refrigerating apparatus is spending this year some six million dollars (£1,200,000) on marketing a new type.

### Our Gas Fire Campaign.

It will be useful, as bearing upon the "Gas Fire Campaign" opened in other columns of the "JOURNAL," to quote here a specific case of what the electricians are doing; and we know that our friends will have no objection to this being done. The example is to be found on the Elthorne Heights Estate, near Hanwell, Middlesex, where extensive developments have been undertaken; and the excellent facilities provided for the acquisition of electrical appliances are described by "Hotspot" in the "Electrical Times." The houses are built by the freeholders, while an associated Company act as selling agents and arrange the electrical equipment, in which they have had much success, mainly owing, in "Hotspot's" opinion, to the "excellent facilities" just alluded to. All houses are fitted with coal grates in the main rooms, the kitchen and two bedrooms are piped for gas, and lighting and power points are provided in every room. In the living rooms there are 15-amp. plugs with combined switch, and in the bedrooms 5·7-amp. size plugs. M.K. plugs and sockets are standardized throughout and are of the all-insulated class, as are also all lamp-holders, &c. The above is standard equipment in every house. Where in addition the purchaser adopts electric service, an electric oven, boiling table, wash boiler, kettle, iron, four radiators, lighting fittings, shades, and Kye lamps are provided. The aggregate cost of this equipment is approximately £50; the purchaser acquires it for a weekly payment of 1s. 6d. This has been made possible by special arrangements of mortgage terms, whereby the cost of the electrical apparatus is added to the purchase price of the house. Houses are assessed at £22, and rates, including water supply, average less than 5s. per week. Gas costs 4s. 4d. per 1000 c.ft. Electricity, on the all-in domestic scale, costs ¾d. per unit used, and a fixed charge of 17s. 6d. per quarter. Supply is also given through 1s. in the slot prepayment meters if required. These are arranged to collect both "fixed" and running charges. The mechanism is set to secure a weekly fixed charge payment of 1s. 6d., which compares with 1s. 4½d. per week when the account is settled quarterly; that is the only difference between the two systems of charge.

# THE NEWS OF THE WEEK

**A Reduction in the Price of Gas** was decided upon at a meeting on July 23 of the Rawmarsh Urban District Council. This reduction, which will be of 3d. per 1000 c.ft., will take effect from the September meter readings.

**John G. Sutherland & Son** have registered, with a nominal capital of £5, as manufacturers of gas, water, and electric meters, ironfounders, and brassfounders. Directors: J. G. Sutherland and T. L. Griffiths, 16, Gem Street, Birmingham.

**The Quality of the Gas** supplied by the Birmingham Gas Department, during the last quarter, was 476·3 B.Th.U. per cubic foot. The declared value of the gas set up by the Gas Referees to the Birmingham City Council is 475 B.Th.U. per cubic foot.

**Plans Have Been Passed** for the Saltcoats Gas Company for an installation of continuous vertical retorts in substitution for the existing horizontal plant at the Company's Union Street Works. The work will be undertaken by the Woodall-Duckham Vertical Retort and Oven Construction Co., Ltd., at an estimated cost of £10,000. The Saltcoats Company at present make about 64 million c.ft. of gas per annum.

**A Dividend of 10 p.ct.** was declared on the capital stock of the Company at the annual general meeting of the Castle Douglas Gas Light Company. The consumption of gas has increased and is now 20 million c.ft. per annum, and there has been a continued demand for gas cookers and fires. It was stated that the increased producing capacity of the works is giving good results and that the "Tully" gasification plant is working satisfactorily. It was resolved to reduce the price of gas from 5s. to 4s. 9½d. for lighting and from 4s. 2d. to 3s. 11½d. for power, to take effect as from May last.

**A Resolution to Increase the Capital** of the Narborough and Whetstone District Gas Company from £24,000 to £34,000 by the issue of 10,000 cumulative £1 6 p.ct. preference shares, ranking in all respects *pari passu* with existing preference shares in the capital of the Company, is being recommended to the shareholders by the Directors, 4000 of such shares to be issued to existing shareholders. The Board have adopted a scheme prepared by the Engineer and Manager for complete renewal of trunk mains to deal with increased load, the output of gas having increased from 45 millions in 1923 to 70 millions up to date. New washing plant is also contemplated in the near future, and an improved "Simplex" water gas plant has recently been put to work.

**Members of the Accrington and District Gas Board** paid their annual inspection to the works on July 23, and spent some time at the Great Harwood Gas Department, where Mr. Harrison (the Manager) explained how the coke oven gas was received from Altham, purified, stored, and distributed to consumers. Methods of testing the gas were described, and satisfaction was expressed that the naphthalene trouble is now at an end. One misconception which the Manager removed was that the Government examiners when testing the calorific value of gas, give previous intimation of their visits. They were provided with keys to the premises and made their visits at any hour of day or night without notice. The gas plant at Great Harwood is maintained in good order, ready to be put into operation in a few days, should any difficulty be experienced regarding the coke oven supply from Altham.

**The National Smoke Abatement Society** will hold their annual conference at Leicester on Sept. 26, 27, and 28. A programme of exceptional interest is expected to ensure the presence of many members and municipal delegates. Dr. Margaret Fishenden, the expert on smokeless fuels and methods of heating, will give a paper on Fuel Research and Smoke Abatement. A meteorological expert will discuss in what ways the smoke laden atmosphere affects the weather, and how the two subjects are related. The important question of visibility is always a problem for the airman, but the smoke pall over the cities and towns very greatly increases his difficulties. This is the first time that this new and pressing indictment against coal smoke has been dealt with at a conference of this nature. The special and difficult questions arising from smoke in the iron and steel industries has recently been examined by the Sheffield Manufacturers' Smoke Abatement Research Committee, and the report, by F. J. Bailey and E. C. Evans, will be very fully discussed.

**The Metropolitan Gas Company of Melbourne** have informed Messrs. John Terry & Co. (Agents for the Company) that the net profits for the six months to June 30, 1930, were £94,328; a dividend of 6s. 6d. per share has been declared; an amount of £8452 has been transferred to reserve account; and a sum of £42,580 has been carried forward.

**Falk, Stadelmann, & Co., Ltd.**, the well-known manufacturers of gas mantles and burners, lamps, and wireless apparatus, announce profits for the year to March 31 last of £107,494. This compares with £97,708 in the previous year. After meeting income-tax and preference dividend, a distribution is declared on the ordinary shares of 7½ p.ct.—the same as for the previous year. A sum of £10,000 is written off goodwill of the gas mantle undertaking acquired during the year, and £4603 is written off patents. Last year nothing was written off these items, but £10,000 went to reserve. There is a carry forward of £25,084, against £13,261 brought in.

## Gas Light and Coke Company's Further Extensions.

### New District Stores at Richmond.

There was a happy gathering at the Richmond Gas-Works on the evening of July 24 on the occasion of the opening of the new district stores, which was celebrated by tea and a bowling match on the new green. The employees were honoured by a visit from Sir David Milne-Watson, LL.D., D.L., the Governor of the Company, and other Directors, and during the proceedings an illuminated address was presented by the co-partners of the Gas Sales Department of the depôt to Sir David and the Court of Directors in grateful appreciation of their generosity in providing the splendid new premises.

The address read as follows: "Presented to the Governor, Sir David Milne-Watson, LL.D., D.L., and the Court of Directors of the Gas Light and Coke Company, on the occasion of the opening of the new Richmond depôt. Sir,—We, the signatory co-partners of the Gas Sales Department, Richmond Depôt, respectfully desire to place on record our grateful appreciation of the action of the Governor and the Court of Directors in providing these splendid new premises for the health, comfort, and convenience of those employed at this station. We have watched the growth of this building day by day with the keenest interest, and we regard with pride and pleasure the excellent accommodation which is now afforded us, and we anticipate that the improved conditions will be reflected in an increased efficiency in the performance of our daily duties. We humbly tender our gratitude and thanks to the Company for the inestimable boon of these magnificent premises, which exemplify the kindly interest and solicitude with which the Company ever considers the welfare of its employees." Appended were the names of the men of the Richmond Depôt.

Acknowledging the presentation and also the manner in which he had been received, Sir David Milne-Watson said that it had given him a great deal of pleasure to come and declare the stores open. It was a very nice thought indeed to present him with that beautiful new key with which to open the door, and added that he hoped that it would prove a golden key, a great deal of gold flowing into the Company through its instrumentality. He would like to propose that the key should remain on these premises as a memento of that day, and that it should be framed as a souvenir of the occasion.

The Governor said he supposed that was the first opportunity he had had of addressing a mass meeting of men from Richmond, and so he would like to dwell for a few minutes on one or two matters connected with the Company. He was delighted to talk to men of the old Brentford Company, and to know that they had settled down happily to the work in Richmond. They had, as they all knew, co-partnership. He was delighted to hear that most of the men were in the scheme.

In addition to the Governor, who presided, there were also present at the tea: The General Manager, Mr. R. W. Foot; the Secretary, Mr. William L. Galbraith; the Chief Engineer, Mr. T. Hardie; the Chief Accountant, Mr. H. E. Ibbs; the Controller of Gas Sales, Sir Francis Goodenough; the Dis-

## *THE NEWS—continued.*

tribution Engineer, Mr. S. Lacey; the Engineer of the Richmond Works, Mr. H. M. Royle; and the Inspector-in-Charge, Mr. H. F. Hudson.

The stores, which consist of a two-storey building, are to be used for the equipment of the district fitters and other purposes. The building has a 30 yards frontage, and is magnificently designed. On the upper floor there are airy, comfortable offices for the use of district foremen. The area which will be covered by men using the Richmond stores includes Richmond, Kew, Barnes, part of Mortlake, Ham and Petersham, and Twickenham.

After the tea and speeches, there was arranged a game of bowls, in which the Governor and the other Officials took part.

## New Low-Temperature Carbonization Association.

An Association entitled the "Low-Temperature Coal Distillers' Association of Great Britain" has been formed of all the leading firms who are actively engaged in the distillation or carbonization of coal at low temperatures. This new body will act as a representative Association in all negotiations with the Government, the mining industry, the Fuel Research Board, and other official departments concerned, and will also take such other measures as will promote the interests of the industry as a whole. The Chairman is Col. W. A. Bristow (Managing Director, Low-Temperature Carbonisation, Ltd.); the Vice-Chairman is Lieut.-Col. J. T. C. Moore-Brabazon (Chairman, L. and N. Distillation, Ltd.); and the Hon. Secretary is Lieut.-Commander Colin Buist, of 39, Grosvenor Place, S.W. 1. The Committee represents the Hird process, the Maclaurin process, the Midland Coal Products, Ltd., and other processes.

## Wallasey Gas and Water Department's Annual Picnic.

The Gas and Water Department of the Wallasey Corporation held their annual picnic on Saturday, July 12, at Bettwys-y-Coed, North Wales.

The party, which included officials and workmen to the number of 120, were accompanied by Mr. H. B. Holliday, Gas and Water Engineer and Manager, and Alderman W. E. Gordon, a member of the Gas and Water Committee. The journey was made in motor coaches from Wallasey, *via* Mold to Ruthin, where an excellent lunch was served at the Castle Hotel. Continuing on through Corwen and the beautiful Vale of Clwyd, Bettwys-y-Coed was reached in the early afternoon in time for tea.

Mr. Holliday, in welcoming the party, said it was peculiarly appropriate they should visit North Wales for their picnic, as Wallasey obtained a portion of its coal supply from the North Wales pits, and the Lakes Vyrnwy and Alwyn were the source of nearly the whole of the town's water supply.

Plenty of opportunity was available for sight seeing in the neighbourhood, such famous spots as the Swallow Falls and Waterloo Bridge being visited. After a very interesting run home, *via* Abergele and St. Asaph, the party arrived safely in Wallasey after a most enjoyable outing.

## Successful Year's Work at Boston.

The Annual General Meeting of the Boston Gas Light and Coke Company was held on Thursday, July 17, at the Company's offices—Alderman T. KITWOOD presiding.

The Directors' report, the adoption of which was moved by the Chairman, read as follows: The net profit for the year amounts to £2417. The balance standing to the credit of the profit and loss account (net revenue), after payment of the interim dividend in February last, amounts to £2685, out of which the Directors recommend payment of the remainder of dividend on both classes of shares at the usual rates—namely, 8½ p.ct. and 7 p.ct.—and that the sum of £103 2s. 6d. be transferred to the reserve fund in accordance with Section II. of the Boston Gas Order, 1929, which (with income-tax) will absorb £1168, leaving a balance to be carried forward to next year's account of £1516.

In November last the price of gas to ordinary consumers was reduced to 10·4d. per therm, with a corresponding reduction to consumers through prepayment meters, while at the same time a liberal scale of discounts to ordinary consumers and consumers of gas for industrial purposes was adopted. The number of cookers on hire at June 30 was 4179, being an increase of 118 during the year. There is an increase in the number of ordinary and prepayment meters of 90. The total meters fixed is 2509 ordinary and 3747 prepayment—in all 6256.

## The Lights of Regent Street.

The Highways Committee of the Westminster City Council have considered methods of improving the lighting of Regent Street between Piccadilly Circus and Oxford Street.

The existing lighting consists of sixteen 3000 candle-power high-pressure gas lamps placed on refuges in the centre of the street and one 1000 candle-power gas lamp on a refuge by Glasshouse Street. After careful consideration the Committee came to the conclusion that a considerable improvement would be effected if the existing central lamps were reduced from 3000 C.P. to 1800 C.P., and additional 1800 C.P. lamps were provided on the footways on alternate sides of the street.

The City Engineer obtained a tender from the Gas Light and Coke Company for carrying out these proposals, and this amounts to £474 15s. for the alterations and the provision of 15 new lamps and £184 3s. 8d. per annum for the increased cost of lighting and maintenance. If this proposal is adopted the aggregate candle-power of the lighting will be increased from 49,000 to 56,800. The Committee, however, anticipate that the improvement in the lighting will be much greater than the proportional increase of candle-power by reason of the more uniform diffusion of light throughout the street as a result of the increase in the number of lighting points.

## Notes from Scotland.

### Montrose Gas Company's Record Output.

Mr. David Smith presided at the Tenth Annual General Meeting of the shareholders of Montrose Gas Company, held in the Town's Buildings on July 23.

Moving the adoption of the report, which was published in the "JOURNAL" last week, Mr. Smith said there had been an increase in the quantity of gas manufactured of 3½ million c.ft., the total quantity manufactured being 78,232,000 c.ft., the largest output in the history of the Company. There had been an increase in capital expenditure during the year, the amount being £1113. The laying of a new pipe at Northesk Road and alterations at Commerce Street were partly responsible for the increase. The investment fund now stood at £6000—an increase of £2000 compared with the previous year. The receipts showed an increase of £100 on gas sold. Residual products had also given a better return. The profit balance was £5906—an increase of about £700 over last year.

It was agreed to pay a final dividend of 5 p.ct., making a dividend of 10 p.ct. for the year. Mr. J. G. Low seconded approval of the report, which was approved.

**The Price of Gas** in Paisley is to be reduced by 1d. per 1000 c.ft., or 0·2d. per therm, from Sept. 30.

**The Cardenden Gas Company** have declared dividend at the rate of 5 p.ct., free of income-tax. The sum of £685 has been set aside for the redemption of debentures.

**A Dividend of 7½ P.Ct. was Declared** at the 27th annual general meeting of the Crieff Gas Light Company. The profit for the year was £2358, inclusive of a balance of £279 carried forward from the previous year, and £300 was carried to the reserve fund, while a balance of £358 was carried forward. The quantity of gas manufactured was 50,101,600 c.ft.—an increase of 5,022,200 c.ft. over the previous year—and the total income was £11,871. The price of gas has been reduced from 4s. 2d. to 3s. 9d. per 1000 c.ft.

## The Tegel Gas-Works in Berlin.

### Visited During the World Power Conference.

The Tegel Gas-Works, the largest of the six Berlin Municipal Gas-Works, and probably the largest gas-works on the Continent, produced in 1928 nearly 160 million cub.m. (5600 million c.ft.) of the total of 490 million cub.m. (17,000 million c.ft.) of gas manufactured by the combined undertakings. The works covers an area of 200 acres, and the maximum daily production of gas is about 700,000 cub.m. (25 million c.ft.). Electric power is supplied by the B.E.W.A.G. (Berlin Electricity Corporation) at 6000 volts, stepped down to 470 and 220 volts for use on the works. Coal is brought to the works by boat and rail, and is delivered to an immense concrete coal storage installation 600 m. long by 50 m. broad, with a capacity of 200,000 tons. The coals used consist of Westphalian coking coals and Durham gas coals.

The carbonizing plant consists of:

(*a*) Four batteries of inclined chambers consisting of 138 ovens of 6·5 to 8·6 tons per 24 hours capacity each.

(*b*) Three batteries of inclined retort benches, each bench comprising eight settings of nine retorts, each retort being 5·1 m. long and having a throughput of about 1 ton per 24 hours (in three charges).

The latter installation is at present idle, and is to be replaced

by a modern installation of Carl Still coke ovens. The heating of the ovens is effected from an installation of fourteen external generators of several types, capable of gasifying lignite or coke, while steam is generated in twenty water-tube boilers burning lignite briquettes, small coke, and breeze. It was surprising to note that no attempt is yet made here to utilize the heat from the huge quantity of coke which is discharged red-hot and then water-quenched in open coke chutes. In addition, there is a water-gas installation consisting of eight Pintsch twin generators having a capacity of 30,000 cub.m. (1 million c.ft.) of B.W.G., or 35,000 cub.m. (1¼ million c.ft.) of C.W.G. each per day. The two gasholders are of approximately 5 million and 8 million c.ft. capacity, telescopic, with 4 and 6 lifts respectively. The works is well interspersed with lawns and gardens; the buildings are splendidly designed and artistically executed, while the gasholders were unrecognizable until pointed out, each being completely surrounded by a circular turreted red-brick wall with dummy windows making them appear like huge artistic edifices, relics, of course, of pre-war practice.

## Beney's "Strikalite."

The accompanying photograph illustrates a neat and novel form of lighter that should appeal to the housewife. The principle is similar to that of the ordinary petrol lighter, but it is worked similarly to the striking of a match. It is robust in construction, sure in action, and there are no moving parts to go wrong.

MODEL 66A.
(Siz 3½"x2"x¾")

The lighter is as simple to use as a match, and much more efficient. It gives a robust flame, and should be ideal for lighting gas cookers, geysers, or fires, or for any purpose where a match flame is required. The makers claim that it will give 10,000 lights for one filling of petrol at a cost of less than 1d.—10,000 matches at 9d. a dozen boxes cost 12s. 6d.

This model (66A) for household use can be supplied in twelve different colours—red, matt black, gold, bronze, mauve, green and gold, oxidized silver, orange, grey, yellow, green, and blue.

The patentee and manufacturer is at 3, Spenser Street, Victoria Street, S.W. 1.

# Reward for Long Service

The annual presentation of certificates to pensioned workmen of the Bristol Gas Company took place on July 22 in the Board Room of the Company's Offices, Colston Avenue—Sir GEORGE E. DAVIES (Chairman of the Company) presiding.

With him were Lady Davies, Alderman F. Fuller Eberle (Deputy Chairman), Messrs. G. H. Boucher, F. C. Burgess, Frank N. Cowlin (Directors), and S. E. Halliwell (Secretary and Commercial Manager), R. Robertson (Engineer), A. Edbrooke (Assistant Secretary), O. J. Preston (Assistant Engineer), and many others.

Tea and an entertainment were provided, and Sir George Davies, in welcoming the pensioners, expressed the pleasure of the Directors in meeting so many old friends on that annual occasion. They appreciated the wonderfully good feeling and the loyalty which had always existed between those who were employed and those who had the management of the different works.

Certainly not the least satisfaction they felt was that all those associated with their important work knew that when old age came they were not cast adrift, but came under the pension scheme which allowed them to look forward with hopefulness and complacency to the time when work was no longer possible.

The number of men who had received long-service certificates up to July 24, 1929, was 61, and on this occasion 19 were presented.

PENSIONERS OF THE BRISTOL GAS COMPANY.

Lady Davies made the presentations as follows:

Henry Baber, 31 years' service; Albert Tizzard, 42; Chas. H. Selway, 42; William Masters, 48; Alfred Bennett, 47; Stephen Bessell, 44; Samuel Jas. Wilcox, 35; Jestimas Jeffery, 37½; Geo. F. Saltford, 22; Robert Andrew, 39; George Dan Price, 43; John Taylor, 42; John Cox, 35; Percy Mildon, 29; Robert Bennett, 51; William Hendy, 50; John Wakeman, 41; William Blanchard, 46; Daniel E. Pritchard, 41.

# GAS SERVICE IN EAST LONDON . .

*Mr. Will Thorne, M.P., opens fine new Gas Light and Coke Company Showrooms, Offices, and Stores in the Barking Road.*

The Gas Light and Coke Company's service to their consumers by no means ends with the provision of efficient modern plant for making and distributing gas. For many years now it has been the policy of the Directors to erect at shopping centres all over the Company's area of supply local showrooms and offices where supplies of gas and coke can be ordered, and where the latest and most efficient type of apparatus can be inspected and chosen. The large number of these offices also makes it possible for the Company's district staff to be within easy reach of consumers' premises for the installation and maintenance of appliances, and for prompt attention to their needs—a very great asset in an area of supply such as that served by this Company.

A further example of this progressive policy is to be found in the opening, on Wednesday of last week, by Mr. William J. Thorne, C.B.E., J.P., M.P., of new showrooms and offices, with their usual accompaniment of up-to-date and conveniently fitted-up stores, at 739/743, Barking Road, E. 13, to serve the needs of some 72,000 consumers in the Company's East London district.

The visitors were welcomed at the opening ceremony by Sir David Milne-Watson, LL.D., D.L., Governor of the Gas Light and Coke Company, and other members of the Court of Directors, and were entertained at tea in the Demonstration Room. With the Directors there were Mr. R. W. Foot (General Manager), Mr. Thomas Hardie (Chief Engineer), Mr. W. L. Galbraith (Secretary), Sir Francis Goodenough (Controller of Gas Sales), Mr. L. M. Simmons (Superintendent of the Rental Department), Mr. Stephen Lacey (Deputy Controller of Gas Sales), Mr. G. S. Gadsby (the Inspector-in-Charge), and other senior officers of the Gas Sales Department, to which is entrusted the task of giving good service to the 1,250,000 consumers in the Company's area.

Among those invited to the opening ceremony, besides Mr. Thorne, were Councillor T. I. Lethaby, J.P., Mayor of East Ham, and many other Councillors and Aldermen, and their wives, from the Boroughs of East and West Ham, together with many prominent residents in the district, and members of the local Rotary Clubs.

Sir David Milne-Watson said he had great pleasure in welcoming Mr. Thorne as their principal guest that afternoon, and in asking him to be so kind as to declare this building open. He had known Mr. Thorne, he said, for a very long time, and he thought he (Mr. Thorne) was probably one of the oldest members of the gas profession in that room. They were sorry that he was not accompanied by Mrs. Thorne, but she, unfortunately, had had to go abroad. In some ways, continued Sir David, it was rather symbolic of the times in which they lived that they should have Mr. Thorne to open these premises. It showed the great change which had been coming over the Company in the course of the last few years. Their relations with the gasworkers were so much closer than they were in the old days, which was a matter for great congratulation to them all. The men were all ready to help forward the great Company and industry which they all served. They had in recent years done a great deal

to educate the workers. In the old days education in the gas industry was confined mostly to the technical officials. To-day they gave opportunity for education to the highest and lowest alike, and there were at the moment no less than 3000 students attending technical institutions from this Company.

They had come into these new premises from a building a little further down the road, and some might wonder, continued Sir David, why they had left their old site. First, it was because they wanted larger premises, and, secondly, these new premises were more suit-

able to modern conditions. The policy of the Board had always been to show gas in the best possible way. They had done a great deal in the West End of London in this direction, and they had no desire to limit their service in any way. Therefore, those who lived in this district would have the same service as if they lived in the West End of the City.

### Presentation to Mr. Thorne.

After describing some of the main features of interest to be seen in the new showrooms, Sir David proceeded to make a presentation to Mr. Thorne to commemorate the occasion. This took the form of a Silver Bowl, on which was inscribed:

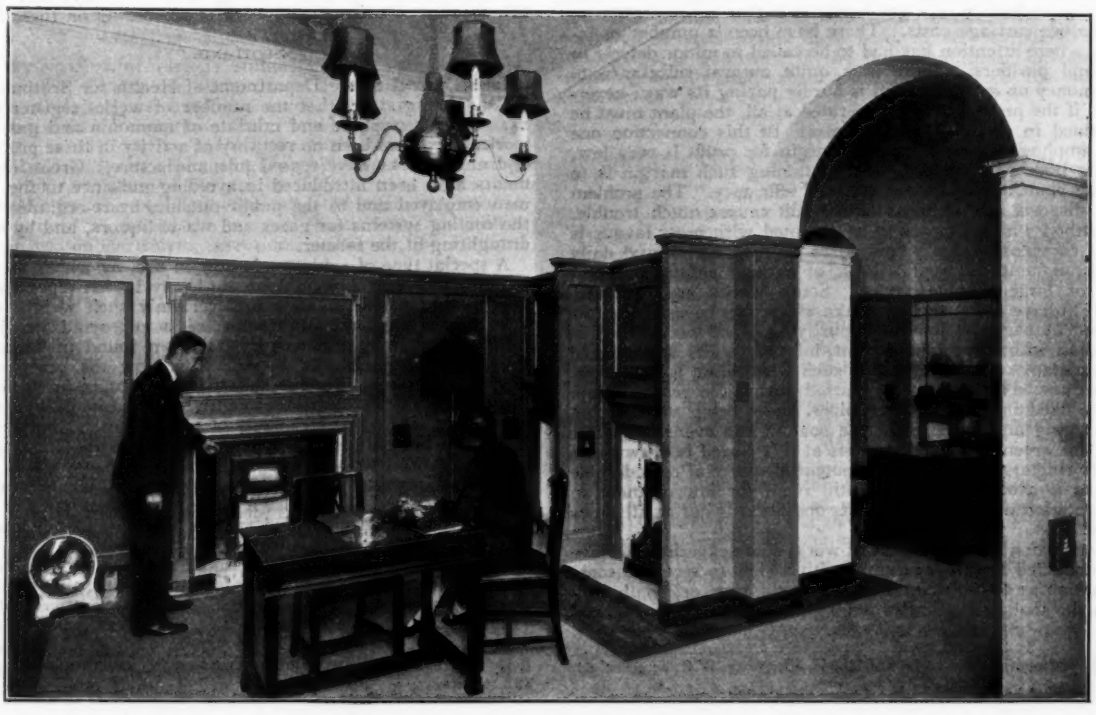
> Presented to William J. Thorne, Esq., C.B.E., J.P., M.P., on the occasion of the opening by him of the new Showrooms of the Gas Light and Coke Company in the Barking Road, 23rd July, 1930.

Mr. Will Thorne said that in the first place he wished to thank the Directors of the Gas Light and Coke Company for giving him the opportunity of declaring open that magnificent building and for the splendid souvenir they had handed to him to mark the occasion. He had received a great number of presents from time to time, but there was none he valued more than this. Mr. Thorne went on to recall the time when he was in the employ of the Company at their Beckton Works; this was about the year 1883. He had been in the carbonizing department, and had worked one of the first stoking machines to be put into operation in this country. This was the largest gas company in the world, continued Mr. Thorne; they had to cater for 4½ million consumers. In spite of the fact that they were faced with the keenest competition, he was of the opinion that the gas industry had nothing to fear by the development of electricity so far as cooking and heating were concerned.

### Cordial Relations with Workpeople.

Referring to the relations between the Company and their workmen, Mr. Thorne said that these were most cordial. In the old days they had some little disagreements, but they had been able to get over all their difficulties, and there was never any serious trouble between the employees and the Company. As far back as 1919 they formed the Joint Industrial Council for the Gas Industry, and Sir David Milne-Watson was elected the first Chairman of that Council; he was Chairman at the present moment. "I myself was the first Vice-Chairman," stated Mr. Thorne, "and I shall never attempt to take the Chair while Sir David is still there to occupy it." In conclusion, Mr. Thorne said it gave him very great pleasure to declare these premises open.

The Mayor of East Ham (Councillor T. I. Lethaby, J.P.) also endorsed what had been said in regard to the cordial relationship that existed between the Company and the workpeople. He was anxious that this cordial relationship should continue, and then the prosperity of the Company would also continue. He himself had been over the technical college at Stratford, and had seen something of the developments in modern education. Big companies



were co-operating with local authorities and with the authorities of technical colleges in the locality, and that seemed to him to be a development of modern education that should be encouraged to the greatest possible degree. Mr. Lethaby referred to the Gas Light and Coke Company's Sports Ground in their neighbourhood at East Ham, which was provided for the use of their employees. This was a line he would like to see other firms adopt in this country. Sport and education encouraged cordial relationship between the men in the various works. He was in full agreement with what had been said as to there being room for both gas and electricity. "May they go on competing with each other, and as a result get something better for the consumer." Though there might be competition, he concluded, there was no need for them to be enemies.

Sir DAVID MILNE-WATSON briefly replied to what had been said, and cordially invited those present to inspect the new premises before leaving.

### THE SHOWROOMS.

The new showrooms at 739, Barking Road have been built to replace the old showrooms in Imperial Market, Barking Road, which have become inadequate owing to the increase in the number of consumers which has taken place since they were acquired in 1910.

The general layout of the new building, which has been designed by Mr. Walter Tapper, A.R.A., F.R.I.B.A., and Mr. H. Austen Hall, F.R.I.B.A., is on similar lines to other showrooms recently constructed in the West End, the whole of the needs of the district being collected in the one building.

The showrooms are designed to help the consumer in choosing apparatus, and a wide selection of the latest types of gas appliances is available for inspection. The first floor is devoted entirely to offices, where all the clerical work connected with the district is carried out, while on the top floor are the staff dining room and club room, and a hall, capable of seating over 200 persons, where free lectures will be given by trained lady demonstrators on cooking and the economical use of gas.

The interior of the showrooms is on the usual attractively spacious lines, with large window spaces and with all the apparatus set out in natural surroundings, and most of them connected up for demonstration if necessary. There is a good selection of up-to-date and artistic lighting fittings and shades; efficient gas cookers in various grades and finishes; gas fires suited to every style of furnishing, and set in attractive surrounds; geysers and hot water circulators of various types; gas-heated wash-coppers; gas irons; refrigerators; domestic coke boilers; gas pokers; and various other domestic and industrial labour-saving appliances. At the time of the opening ceremony a gas-heated clothes washer was being demonstrated, while a gas iron was also seen in operation. In one section the process of mantle making for incandescent burners was to be seen and attracted much interest. A new type of portable heater and the gas heater for linen cupboards were also on view.

At these new offices consumers will be able to make their inquiries; obtain advice upon the economical use of gas for any purpose, domestic or industrial; lodge their complaints, if any; and pay their bills.

### THE STORES.

A large building on two sides of the yard at the back of the main building has been provided for the fitters and their stores. It has been particularly necessary to provide large accommodation for the outdoor staff, as the Company's business in the district has increased very greatly during the past twenty years and is constantly increasing. There are now about 200 fitters working from this office, and a considerable amount of space is needed to meet all their requirements. These fitters, who are all experienced men in their trade, are responsible for satisfactory service to the 72,000 consumers in this area of the Company's supply, who use between them over 11 million therms every year.

It is the established policy of the Company to assist their consumers in every possible way to secure the greatest possible value for the gas they pay for, and to give them such good service as will secure their full satisfaction; and the opening of this new "service centre" is another step in that direction.

# Alkali Works Chief Inspectors' Reports for 1929*

The Chief Inspector for England and Wales, Mr. W. A. Damon, states that the number of works registered in 1929 was 1083, which entailed the inspection of 1975 separate processes—a reduction of 13 in the number of works and of 8 in the number of separate processes as compared with the previous year. The number of visits of inspection by District Inspectors to registered works during the year was 3449. In addition, 130 visits of inspection were made to other works.

The low selling price of sulphate of ammonia makes its manufacture uneconomic in small units. The tendency therefore to concentrate production at the larger works naturally continues, and this has resulted in efforts being directed towards the production of a gas liquor of higher concentration so as to reduce carriage costs. There have been a number of instances where attention has had to be called to minor defects in plant and purifiers. There is a quite natural reluctance to spend money on a plant which is hardly paying its way; nevertheless, if the process is to be operated at all, the plant must be maintained in reasonably good order. In this connection one would emphasize that, when the margin for profit is very low, the only hope of increasing or maintaining such margin is to keep the plant at the highest pitch of efficiency. The problem of the disposal of the spent liquor still causes much trouble. The method which appears to be accepted with most favour is that of compensating the flow so as to ensure an equal daily flow throughout the year. This, of course, entails the provision of large storage tanks. Some works are fortunate enough to have old gasholder tanks which can be used for this purpose. A bacterial treatment purifying plant has worked in connection with one sulphate plant, but the results are not held to be satisfactory, and the cost of such purification is very high.

Three new coke ovens were started during the year. Steam jets are fixed in the ascension pipes, these being used during the charging and levelling of the coal in the ovens. By this means the green gas which escapes at this period is drawn into the purifying system, and thus a potential source of considerable nuisance is avoided. There is still room for improvement in the adaptation of this device, as its operation is not at all times efficient.

In connection with this class of work, some experiments have been conducted in this laboratory with a view to securing some information as to the manner in which chlorine, originally present in the coal, is distributed among the products of carbonization.

There has been a drop of four in the number of tar works registered. This is due to the continued tendency of gas-works, especially the smaller undertakings, to join the co-operative concerns which aim at the centralization of tar distillation. Another complaint against a tar works referred to general smells. These arose largely from storage tanks, and close covers have done much to reduce them. The use of enlarged covers at the pitch outlet of tar stills is much to be commended. Much trouble has been caused and great expense incurred by reason of corrosion of tar stills, due, it is thought, to the presence of ammonium chloride. Attempts to remove the ammonium chloride by pre-steaming of the tar have met with a fair amount of success, and work is proceeding on these lines.

### SCOTLAND.

In his report to the Department of Health for Scotland, Mr. J. W. Young states that the number of works registered was 141. As for sulphate and muriate of ammonia and gas liquor works, there has been no recovery of activity in these processes; and more works have ceased to manufacture. Great improvements have been introduced in avoiding nuisance to the workmen employed and to the public outside, by re-organization of the cooling systems for gases and waste liquors, and by special draughting of the former.

A special type of saturator is now in use, by which the dome is relieved from the weight of the heavy leaden pipes entering and leaving it. Ultimately and certainly such weight causes distortion of the dome and fracture of the pipes and their joints; hitherto only a partial remedy has been found in suspending these pipes from beams above. It is now the practice at a works, of three continuous shifts, for each man as he finishes his turn to wash down thoroughly and leave all tidy to his successor. It may seem merely of small moment, but the gain is notable not only in the appearance, but in the endurance of plant, and the goodwill among the men.

The fall in value of tar, and its constituents, has been serious to producers and distillers. A large continuous still, of novel design, to produce pitch and various fractions of oil, has been erected and successfully worked.

It is thought in some of the smaller works, relying entirely upon local trade, and having inadequate storage, that their difficulties in summer would be less if road engineers were allowed to buy tar before mid-May. The managers point out that several weeks of spring are wasted, during which weather generally is dry. There has been no cause for complaint against tar works.

* H.M. Stationery Office, Adastral House, Kingsway, W.C. 2; price, 6d net.

# STEEL MAINS AND CORROSION . . . .

*This is the second and concluding article by E. E. JEAVONS, M.Inst.C.E., and H. T. PINNOCK, M.A. (Oxon.), F.I.C., who, as a result of their original researches, explain how electrolytic corrosion of steel mains may be prevented.*

### Recommendations and Reasons for Earth Bars.

The recommendations in the report were adopted where possible and immediately put into execution. Copper bonds over joints were placed only systematically as joints were exposed to repair leakage, but earth bars were fitted at all exposed places, at as regular intervals as possible, and in particular at every main over railway, river, or canal. Nearly 200 have been fitted. It was also recommended that cast-iron specials should be bonded, and earthed where necessary, as these were also found to be subject to electrolytic corrosion. This work was carried out at the same time.

The method of copper bonding over joints was as follows:

(N.B.—Copper bonding is not necessary on mains with joints electrically or gas welded.)

Small pieces of copper strips (about 3 in. longer than the lead joint and ½ in. by $\frac{1}{16}$ in. section) were drilled at the ends. Two ¼ in. set screws were threaded through and into holes tapped and threaded in the main; this was easy to do as there was plenty of metal at the lock bars, in the Mephan Ferguson Lock Bar pipe, used on the Mond Gas Company's mains. Copper washers were used, and after screwing up the bonding strips the main was tested to see that there was no resistance across the joint.

The method of fixing the earth bars was as follows:

A hole was bored into the earth vertically downwards by ordinary 3-in. diameter boring tackle, for about 20 ft., or until water was reached. A steel bar, 2 in. by ⅜ in. by 20 ft., was then inserted into the hole or down to water. This bar was then attached to the steel main in good electrical contact (tested for good conductivity) and protected at the main after fixing, by a good insulated coating. The method of attachment was by a set pin screwed through the bar (copper washers being used) and into the steel main. The main itself was then tested electrically to see that the bar was functioning as an earth, and that the main itself was at zero potential with respect to the surrounding earth. The testing is done quite simply, using an ordinary milli-volt meter and milli-ammeter. (See Appendix No. 2.)

The earthing of the Mond mains was practically completed in 1918-1919 and is entirely successful, and the copper bonding of joints is still being continued systematically as joints are opened for stopping leakage.

### Reasons for Earthing.

We can agree with various authorities that completely insulated return circuits are *theoretically* a remedy and a preventative of electrolysis, but, in practice, this is impossible of attainment, and our solution of the problem by fitting earth bars to the mains, and so passing the stray current to earth, accomplishes the main object of giving the current something cheap to corrode instead of the pipe itself.

As in practice, the complete elimination of mains currents is impossible, and as where the current passes from a metallic conductor into an electrolyte, corrosion must occur, the solution of the problem is:

Transfer that corrosion from an expensive main to a cheap earth bar which is, when required, easily renewable.

Really two purposes are served:

(*a*) Corrosion of the main is prevented by the alternative path to earth through the bar.

(*b*) The total amount of current flowing in the main is diminished by each earth bar fitted, and the rate of corrosion of the earth bars diminished.

### Ten Years' Proof of the Efficacy of Earthing Mains.

Through the courtesy of Mr. S. Waddington, the General Manager of the South Staffordshire Mond Gas Company, the actual results are available of the bonding and earthing work done on the distribution mains, after the recommendations in the report were adopted and carried out in 1918.

The earth bars (nearly two hundred in number) are all functioning as predicted—several inches (and in one case over 12 in.) of bar are corroded away, but the corrosion of the mains themselves has been greatly minimized as hoped, and has been almost stopped. There is no doubt that if continuous bonding had been possible the corrosion could have been actually stopped. The number of patching plates fitted dropped from an average of 34 per year for eleven years to a total of three for 1928, and the Company is now satisfied that the danger from electrolytic corrosion has practically disappeared.

The choice of steel mains in the first place for distribution in a mining and industrial area has been amply justified in the case of the Mond Gas Company, and it is fairly certain that, in the light of more recent experience, if steel mains are welded at the joints and thus made continuous electrical conductors and earthed in the manner already described to prevent corrosion, the risk of dangerous explosions due to breakage or leakage (such as have frequently occurred in this country) would be greatly minimized. The extra safety of life and property alone would be ample justification, and demands that something on the lines indicated should be done in the construction of new pipe lines.

The authors' 25 years' experience has led them to the conclusion that for the gas industry generally the safest, cheapest, and best method of distribution would be that in which steel mains, with welded joints, earthed at short intervals and carrying gas at high pressures are adopted, and the last ten years have shown that immunity from corrosion can be secured with steel mains, even in industrial areas where stray electric currents abound.

### Conclusion.

As a result of the authors' investigations, they go further than their predecessors and say that even if there were no leakages whatsoever from electric tramways, there would still be, in the soil, stray electric currents (of small magnitude perhaps) from many industrial processes; and also, in the case of electric welding plants, currents of fairly high potential. Gas and water mains are bound to pick up these currents and convey them to some anodic point or points, where a higher potential in the main than in the surrounding ground causes current to leave the main, bringing about pitting and corrosion; hence the necessity for earth bars on a continuously jointed pipeline to shunt the corroding current to earth, and let the earth bar itself corrode instead of the main.

It will be admitted that years of subsequent practice should confirm or disprove the correctness of theories and experiments, and it is because the practical results obtained in preventing corrosion of steel mains have been so very satisfactory that this article is published in the hope that those interested in mains generally may reap some benefit from the authors' experience.

### Appendix (1).

### A SPECIFICATION FOR PREVENTING ELECTROLYTIC CORROSION.

#### Coating of Pipes (Cast-Iron or Steel).

Owing to an extensive and careful electrolytic survey having brought out the importance of a good insulating coating, it is of the utmost importance that the bituminous coating be as perfect as possible.

#### Copper-Bonding the Joints of Pipes (Where Not Welded).

All the pipes and specials, if not jointed by welding, shall be copper-bonded over the joints (whether lead, flanged, or screwed joints) in the following manner:

(N.B.).—In the case of welded joints no bonding is required, and a welded main is the best and most continuous electrical conductor.

#### Method.

A strip of copper ½ in. by $\frac{1}{16}$ in. of sufficient length to bridge the joint shall be used with a ¼-in. set screw at each end.

Two holes shall be drilled, one at each end of each pipe, in the most suitable place; and the copper strip tightly screwed and copper washered to the main where specially brightened for better contact, thus bridging the joint, and making each pipe in good electrical contact with its neighbour.

If the pipe is not thick enough (as in the smaller sizes) a boss can be welded on the main and tapped to take the ¼-in. set screw.

Before filling in, the whole to be coated with the specified bituminous coating.

The main when finished to be tested and proved to be a con-

tinuous conductor of electrical currents, however small in intensity and amount. (See Appendix 2.)

EARTH BARS.

At suitably chosen intervals (roughly, about ¼ mile apart and preferably where near water) good and efficient earth bars shall be fitted to the main in the following manner:

A 3-in. bore-hole shall be sunk vertically in the trench bottom at the side of the main, to the required depth, and a wrought-iron or steel bar 2 in. by ⅜ in. inserted.

This bar shall be fastened to the main, by welding or otherwise, in good electrical contact, and finally tested with electrical measuring instruments to see that it is functioning properly.

After testing, the bore-hole (if the water has not been reached) is to be filled and packed with suitable wet material, such as coke breeze.

The contact to the main shall also be coated over with the specified bituminous coating before filling in.

The aforementioned bore-hole shall be sunk to such a depth as will ensure permanently moist ground for the earth bar.

Boring should be continued down to 20 ft., if no water is found, before reaching that depth. It is highly desirable that the bar should rest in water, if possible.

BRIDGE CROSSINGS (OVER RAILWAYS, CANALS, OR RIVERS).

All bridge crossings to be copper-bonded over all pipe joints where not welded, and earthed as described at one side into water or moist ground.

The constant aim must be to have the main as near zero potential, referred to the surrounding ground, as possible.

**Appendix (2).**

ELECTRICAL TESTING OF EARTH BARS.

The only apparatus required is a reliable make of portable milli-voltmeter reading 0 to 20 milli-volts with a centre zero on the scale, and provided with a pair of insulated leads about 12 ft. long fitted with spade terminals.

The method of testing the functioning of the earth bar is as follows:

(*a*) Place the earth bar in position in its bore-hole, connect it up to the main, as described, by means of the set screw and washers, and fill the bore-hole with coke breeze (if required), ramming it tight. If the end of the bar is in water and does not require any breeze, simply ram in with earth.

(*b*) Remove the set screw and washers and spring the end of the earth bar away from the main and insert a piece of ebonite or any suitable insulating material to insulate the bar temporarily from the main.

(*c*) File a bright patch anywhere on the bar and a similar patch on the main near the spot at which the bar will eventually be fixed.

(*d*) Place one lead from the milli-voltmeter in contact with the bright patch on the bar and the other on the bright patch on the main. A deflection of the milli-voltmeter pointer will now be obtained, and in many cases it is quite likely that the deflection will be so great that the pointer will be off the scale against the stop; this is immaterial.

(*e*) Remove the ebonite, and couple the earth bar up to the main, taking care that the washers and end of the earth bar are clean and bright to ensure good contact.

(*f*) Again test with milli-voltmeter leads in contact with the filed patches on bar and main. No deflection whatever should be observed. If there is any deflection, however slight, this means that there is some resistance at the joint, and the set screw, bar, and washers must be cleaned afresh and then screwed up tight and the tests repeated until no deflection is observable.

When no deflection is observable, the earth bar is functioning properly, and the joint may then be bitumen coated as described.

DETERMINATION OF THE POLARITY OF MAIN.

Although in testing the earth bars there is no necessity to know the polarity of the main, this information is often of value for reference and may be obtained with the same milli-voltmeter. The procedure is as follows:

Attach the leads to the milli-voltmeter and fasten the other end of the positive lead to the positive terminal of a single dry cell or two-volt accumulator. Then lightly and momentarily touch the negative terminal of the cell with the negative lead from the milli-voltmeter, and note the direction of the pointer's kick.

(*Note.*—The contact to the dry cell or accumulator must only be a very rapid flick, otherwise the multi-voltmeter will be damaged.)

When testing always put the *plus* lead on the main and the *minus* on the bar.

Assume (for example) that on the cell test the pointer was deflected to the right, then if when making a test the pointer moves to the right with the positive lead on the main, the main is positive in respect to the bar or ground and is in the anode condition.

If under these conditions the pointer moves to the left, then the main is negative in respect to the bar and is in the kathode condition.

# From the "JOURNAL" Eighty Years Ago.

Mr. JAMES WILKINS rose to move a resolution. He said: The great object of this meeting is to get cheap gas. ["Hear, hear."] I am not a gas consumer now, but I *were*. [Laughter.] I burnt gas in Great James Street, but they cut it off. [Cries of "What for?"] We have brought gas down from 12s. per thousand to 5s., and we mean to have it at 4s. That is the next thing.

Mr. M'DOWALL, in seconding the motion, dwelt on the importance of having cheap gas, denounced monopoly, and objected to Acts of Parliament for the special benefit and protection of existing companies. Gas should be dealt with on the same principles as bread, butter, and other articles. ["Hear, hear," and loud cries of "Coffee," and "No chicory," in allusion to Mr. M'Dowall's business.] The men who were now making immense fortunes out of gas allowed the inventor to die in a London workhouse. ["No, no."] Well, if the originator did not die there, he was at all events a long time within the walls of a workhouse. ["No, no," and "Hear, hear."]

Mr. PEARSE rose to reply, to contradict this assertion; and having been called to order by a gentleman in the neighbourhood of the chair, some very strong language, as well as cards, was exchanged. In various other parts of the room the cause of disorder was promoted with similar success, but nothing else but hard words ensued. Mr. Pearse, who had been on his legs for a considerable time, manifesting the strongest desire to be heard, was now informed that he might address the meeting.

He said: Gentlemen, I appear before you to-night; I have taken no notes of the rambling speech by Mr. M'Dowall; but allow me to commence my observations with a statement he made, which is important as to the character of the old-established companies.

A VOICE: Are you a ratepayer?

Mr. PEARSE: Yes.

A VOICE: Where do you reside?

Mr. PEARSE: My name is William Pearse ["Who gave you that name?" and laughter], and it is well known where I reside. One of the most prominent untruths which he (Mr. Pearse) felt called on to contradict was the statement made that the respected inventor of gas lighting and founder of the parent gas company (the Chartered), which had lighted the south-eastern district of Marylebone for forty-five years, had died in a workhouse. ["Hear, hear," and cries of "Question," "Cheap gas, cheap gas."] That gentleman was Mr. Winsor. So far from having died in a workhouse, he died in France, where he lived ten years before his death. The Chartered Company allowed him £200 per year till his death, and the same pension to his widow for eleven years after it, and his son was now one of the Directors of the Chartered Company. So much, therefore, for the statement of Mr. M'Dowall and the ingratitude of the old gas companies to the originator of gas lighting. [Cries of "Question," and great uproar.] . . .

Here an attempt was made to push Mr. Pearse off the platform, and the greatest confusion prevailed for some time.

Mr. PEARSE: It is Mister Edward Smith, Esq., of the Tyrawley Arms, who is interrupting me; but I am determined to be heard. It has been said that the Imperial Company charge in this parish too high for the public lights. ["Hear, hear," and cries of "So they do."] My name is William Pearse, and I deny it. [Uproar.] I say that the parish of Marylebone have, with the Imperial Company, one of the most advantageous gas contracts in England. [Cheers, "Oh, oh!" and uproar.] I say so, and I challenge Messrs. Easton and Amos, the engineers of the new company, to prove the contrary. I challenge Mr. George Frederick Argles to prove the contrary. [Uproar.] Why are they not here? ["We don't want them."] But I do, and I will never rest satisfied till we have them before the gas consumers of Marylebone. [Cheers, and great confusion.] I challenge them to meet me at the Literary Institution to go into the question, and I will prove that you, the people of Marylebone, have at this moment good and cheap gas. [Laughter, "Hear, hear," and "No, no."] I repeat it; you have both. [Renewed uproar, and cries of "Turn him out!"] I will test it and prove it, and will put down £50 to meet Messrs. Easton and Amos, and prove it—that you, the inhabitants of Marylebone, have good and cheap gas already.

A VOICE: We must have it cheaper still. [Cheers and confusion.]

Mr. PEARSE: . . . I contend that the consumers of Marylebone do not want this fallacious humbug company.

Mr. STAINES: "Retract the word humbug." [Loud cries of "Retract, retract."]

Mr. PEARSE: You're not a humbug. . . . I said humbug company. [Great confusion.] . . . I am a member of the Great Central Gas Consumers' Company—and I here pronounce it as one of the greatest frauds ever perpetrated. It was founded by deception, and maintained by deception and falsehood.

# THE "JOURNAL" TECHNICAL RECORD

*Which also contains Full Reports of Meetings of Gas and Allied Associations* ———

## Bye-Product Coke and the Gas Industry*

**Important Relationship Evident when Considered Production of Gas Last Year Totalled 858,000 Million C.Ft.**

By D. L. JACOBSON, of the Koppers Company, Pittsburgh.

The bye-product coke industry has had two main purposes: First, to supply the steel industry and domestic consumer with coke; and, second, to supply gas to public utilities distributing manufactured gas. In addition to these main products, the bye-products consisting of ammonia, tar, and light oil have been of great importance.

The magnitude of the bye-product coke and gas industry can be realized from the following estimates of the production by this industry for 1929, which are as follows:

| | |
|---|---|
| Bye-product coke | 54,000,000 tons |
| Gas | 858,000,000,000 c.ft.* |
| Tar | 700,000,000 gallons |
| Ammonium sulphate | 880,000 tons |
| Crude light oil | 208,000,000 gallons |

* Includes gas used in heating the coke ovens.

### THE BYE-PRODUCT COKE OVEN.

The bye-product coke oven consists of a silica brick chamber which is maintained at a high temperature (about 2000° Fahr.). Heat is supplied to the ovens by gas burning in adjacent flues. The hot ovens are filled with coal and then closed airtight. The coal is carbonized in a period of about 12 to 20 hours, leaving hot coke in the oven, which is then discharged. During carbonization, the gas and bye-products are distilled off and recovered in special apparatus. The products from the carbonization of 1 ton of coal† are approximately:

1300 to 1400 lbs. of coke.
10,000 to 11,000 c.ft. of gas.
9 to 12 gallons of tar.
23 to 26 lbs. of ammonium sulphate.
2·75 to 3·5 gallons of light oil.

### RAPID GROWTH OF THE BYE-PRODUCT COKE INDUSTRY—RELATION TO THE MANUFACTURED GAS INDUSTRY.

The bye-product coke industry is only 36 years old in this country. In the days before the introduction of the bye-product coke oven, metallurgical coke was produced in America in wasteful beehive ovens. Bye-product coke ovens, recovering the gas and other valuable products, now produce 90 p.ct. of all the coke made in this country, only 10 p.ct. being produced in beehive ovens.

The manufactured gas industry in the United States dates back to 1816. In the past 25 years the sales have increased from 104,000 million c.ft. per year in 1904 up to about 535,000 million c.ft. of gas in 1929. The manufactured gas industry first received gas from coke ovens in 1899. By 1920, the manufactured gas industry was distributing 53,000 million c.ft. of coke oven gas per year.

In the short period of 10 years following, the amount of coke oven gas distributed for city use has more than tripled. It is estimated that 175,000 million c.ft. of coke oven gas were produced or purchased by the manufactured gas industry in 1929. As the total manufactured gas produced in the same year amounted to 474,000 million c.ft., 37 p.ct. of all the manufactured gas originated in coke ovens; 10 p.ct. of the manufactured gas supply consisted of retort coal gas, and the remainder was mostly water gas.

### FACTORS LEADING TO THE INCREASED USE OF COKE OVEN GAS FOR CITY USE.

One of the most important factors responsible for the rapid growth in the amount of coke oven gas distributed for city use has been the use of low B.Th.U. gases such as producer gas and blast furnace gas for heating coke ovens.

Bye-product coke plants located so that metallurgical coke is the principal product are often heated by part of the valuable gas produced in the coke oven itself. Where a favourable market for city gas is available, the coke oven may be heated by gases of lower heating value, such as producer gas or blast furnace gas. By substituting low B.Th.U. gases for oven heating, all the valuable coke oven gas is made available for sale, and the coke oven gas production is increased from about 6500 c.ft. per ton of coal up to about 11,000 c.ft. of gas per ton of coal.

In order to satisfy the various requirements of public utilities, bye-product coke plants have been built ranging in capacity from about 1 million c.ft. of gas per day up to about 30 million c.ft. of gas per day. The plants of lower capacities use a newer type of small coke oven which is similar in every way to the larger coke ovens and which embodies all the improvements of the larger ovens.

The first coke oven plant underfired with producer gas from a central producer plant was put into operation at Providence, R.I., in 1920. Since the introduction of producer gas underfiring and of the smaller bye-product oven adapted to plants of lower capacities, there has been a rapid expansion in the use of bye-product ovens for the manufacture of city gas. A further impetus to this expansion was given by the introduction in the United States of blast furnace gas for underfiring coke ovens, in 1927. The increased use of coke oven gas was also favoured by an important invention, the Becker oven.

### THE BECKER COKE AND GAS OVEN.

In 1922, a new type of coke oven was introduced in the United States. This new oven was the invention of Joseph Becker, of the Koppers Company. Radical changes in the design of heating flues were made in the new oven, as compared with previous ovens. The design of the older ovens was such that a practical limit had been reached in the maximum size coke oven unit that could be built, and these limitations were particularly acute where producer gas or blast furnace gas was used as the heating fuel. The new Becker oven removed these limitations, and opened up a greater field for the use of low B.Th.U. gases for heating coke ovens, thereby releasing more coke oven gas for sale. The new design of heating flues also permits a more uniform heating of the coke oven wall from bottom to top, so that the coke produced in the Becker oven is much more uniform in quality than that produced in the older ovens. The new oven was rapidly adopted for the construction of coke and gas ovens, both large and small. How important the Becker oven has been to the American bye-product coke industry can be readily seen from the fact that the total annual coal carbonizing capacity of Becker ovens, built in a period of only eight years, is now equal to 30 million tons. This may be compared with a figure of about 77 million tons of coal which represents the total coal carbonized in 1929 in all the coke ovens operating in this country.

The coke oven gas being distributed for city use is derived from four different types of bye-product plants. These may be classified as follows:

1. Bye-product coke oven plants directly identified with blast furnaces or steel plants, but which are favourably located so as to sell part or all of their surplus gas to public utilities for city use. These coke ovens are underfired with coke oven gas. The coke plant of the Toledo Furnace Company at Toledo, Ohio, is an example of this type of plant.

2. Plants of the same type as above, except that special attention has been given to increasing the gas production by underfiring the ovens with producer gas or blast furnace gas. The coke plant of the Youngstown Sheet and Tube Company at South Chicago, Ill., comes under this class.

3. Bye-product coke and gas plants not connected with steel mills, which act at the same time as merchant coke plants selling metallurgical, water gas, and domestic coke, and as gas plants selling coke oven gas for domestic use. These plants ordinarily have full-size coke ovens which are usually underfired with producer gas. The Seaboard Bye-Product Coke Company at Kearny, N.J., is a representative plant of this kind.

4. Bye-product gas plants directly connected with a public utility. These plants may have full-size ovens or in many cases

* From the "Oil and Gas Journal," June 5, 1930.

† The yields per ton of coal vary for different types of coal.

ovens of smaller capacity, 4 to 7 tons of coal per charge. The bye-product gas oven plant of the Utica Gas and Electric Company at Utica, N.Y., comes under this heading.

In addition to the large market for blast furnace, foundry, and water gas coke, there is a rapidly expanding market for domestic or household coke. In a period of 10 years, sales of bye-product domestic coke have increased from about 1 million tons in 1918 to over 6 million tons in 1928. Domestic coke sold in 1928 was one-eighth of all the bye-product coke produced in that year.

This domestic coke is a carefully sized coke, screened from the product made both in large and small coke ovens. The quality of coke, both domestic and of the other types, has been greatly improved, due to the use of higher quality coal and to the improvements in the design of coke ovens. Domestic coke is a smokeless fuel, and the popular demand for this type of fuel is increasing.

### Importance of Blast Furnace Gas and Producer Gas for Underfiring Coke Ovens.

Of the 858,000 million c.ft. of gas produced in coke ovens in 1929, about 300,000 million c.ft. were used to heat the coke ovens themselves. All of this 300,000 million c.ft. of valuable coke oven gas could be released for sale as city gas if these coke ovens were underfired with low B.Th.U. gases such as blast furnace gas and producer gas. A large percentage of the ovens that are at present underfired with coke oven gas are so designed that this change in underfiring could be readily installed.

In addition to the 300,000 million c.ft. of gas used for heating ovens, a further amount of about 300,000 million c.ft of gas was used in the steel plant.

This large volume of steel plant gas could also be given a higher value if it were distributed for city use and replaced by lower grade fuels.

As stated previously, the use of producer gas for underfiring coke ovens has been increasing rapidly since 1920. The gas producer utilizes the smaller sizes of coke, so that the producer gas is generated from a lower grade fuel available right at the coke plant.

Blast furnace gas is a very low B.Th.U. gas, the heating value being about 90 B.Th.U. per c.ft. As produced at the blast furnaces, it carries considerable dust and dirt. The purification of this dirty gas has been worked out in a completely successful manner, and a clean gas has been produced suitable to be heated in coke oven regenerators and burned in coke oven heating flues.

The use of blast furnace gas for heating coke ovens was first introduced in the United States about three years ago at the South Chicago plant of the Bye-Products Coke Corporation. The blast furnace gas is preheated in coke oven regenerators, similar to the practice with producer gas. Uniform flue temperatures and excellent heat efficiency are being obtained in operating with blast furnace gas underfiring.

At the present time, two coke oven plants are operating in the Chicago district with blast furnace gas underfiring supplying a maximum of 52 million c.ft. of city gas per day, and another plant under construction will raise this figure to 61 million c.ft. per day. An active growth in this practice of underfiring with blast furnace gas so as to release additional coke oven gas is expected in the near future.

### Centralization of Gas Production in Large Coke and Gas Plants.

The centralization of city gas production into large bye-product plants capable of supplying a large area which may include a number of smaller cities is a step in the direction of economy and leads to the production of higher quality coke, gas, and bye-products. Such large central bye-product coke and gas plants are naturally supplemented by long-distance transmission lines carrying the coke oven gas under pressure to all parts of the long-distance distribution system.

An example of the present tendency to build large central bye-product plants is the plant of the Connecticut Coke Company at New Haven, Conn. Some 65 miles of high-pressure distributing main carries the coke oven gas to Hartford, Bristol, and other cities. This single coke and gas plant produces 65 p.ct. of all the gas consumed in the State of Connecticut. The gas is compressed to a pressure of 40 to 50 lbs. per sq. in., and is transmitted to the various cities by the Connecticut Power and Light Company. The daily gas production at New Haven amounts to 14 million c.ft., half of which is consumed at New Haven by the New Haven Gas Light Company, the rest being sent into the high-pressure lines.

# Dehydration of Gas, with Special Reference to Experience with Compression Methods in Small Plants*

By W. S. Dole, Gas Engineer, Federal Light and Traction Company, New York City.

Dehydration of manufactured gas is something all of us in time are coming to; first, because of the very much better service the gas customer receives, and second, because it shows a profit in dollars and cents to the gas company.

The object of this paper is simply to give the results of dehydration by compression in two small south-west towns.

Two things are responsible for most of our distribution troubles—water and naphthalene. Dehydration does away with these two evils. With these two causes removed, distribution maintenance becomes a minor burden and consumers' complaints show a gratifying decrease.

All of you are familiar with the advantages to be obtained by dehydration and the methods of doing it; therefore I will merely summarize them.

### Advantages Resulting from Dehydration.

1. A vastly improved service to the gas consumer.
2. " Poor pressure " complaints practically eliminated.
3. A better feeling on the part of the gas customer towards the gas company.
4. Drying up of the distribution system, with a resulting lessened internal corrosion for mains and meters.
5. Longer life for mains, services, and meters.
6. Reduced cost of maintenance on mains, services, and meters.
7. Naphthalene stoppages eliminated.
8. Saving in cost of pumping drips.
9. Carrying capacity of mains and services increased, due to drying up of water in sags in the mains and to the picking up and carrying on of naphthalene deposits.
10. No more frozen services.
11. Stoppage of pilot lights largely done away with.

Dehydration has the disadvantage, if it is a disadvantage, of reducing the volume of gas about 20 c.ft. for every pound of condensate removed. However, this happens anyway to some extent in every distribution system where drips need to be pumped.

Three methods of dehydration are available commercially:

(1) Compression.
(2) Absorption of the water vapour chemically.
(3) Refrigeration.

The compression method has the merit of simplicity. Water vapour and naphthalene are both removed in one operation.

It has the disadvantage of a higher operating cost. However, this cost may not be out of line if the gas is already being sent out at a higher than holder pressure. Another disadvantage is that in addition to the naphthalene some of the light oils are removed with a slight reduction in the B.Th.U. values. This amounts to about 5 B.Th.U. per cubic foot in the case of a coal gas plant on a compression ranging from 30 lbs. to 50 lbs. and 2 to 10 B.Th.U. on straight oil gas with 30 to 50 lbs. compression. This loss varies with the heats carried in the oil gas machines. An oil fog, 2 to 3 gallons of oil per million c.ft., should be sprayed into the gas. This keeps an oil film on the inside surface of the pipes and helps to prevent corrosion. Care should be taken to use an oil that will not damage the meter diaphragms.

The absorption process is much cheaper to operate than the compression process, and is the one generally used in England, where plants have been in operation since 1926. Very little B.Th.U. value, if any, is removed by this process. A naphthalene removal plant should be installed in connection, which adds a small complication. This will add sufficient oil to cause an oil film to cover the interior surface of the mains and services and prevent drying out of the meter diaphragms.

The reagent commonly used for the absorption of water vapour is calcium chloride. Where a wet purification plant is operated, one of the bye-products, a solution of sodium thiocyanate, is used. The outstanding installation using this last material is the one at Grand Rapids, Michigan.

The absorption process is somewhat the cheapest of the three available methods to install.

With this process care must be taken to prevent any en-

* Paper at the Annual Meeting of the Canadian Gas Association.

trained salts from being carried over with the gas because of the bad corrosion effect it may have on mains, services, and meters. Unfortunately, much damage may have been done before this carrying over is detected.

Dehydration of manufactured gas by refrigeration in theory looks well, but in practice has certain disadvantages. The limit of cold in the cooling water is about 35° Fahr., which means a minimum dew point of about 40°. Many companies would find this quite low enough, but I fear here in Canada, for several months in the year, ground temperatures will be lower than 40°.

One thing quite necessary with dehydration by refrigeration is that all naphthalene must be removed before the refrigeration to avoid complications resulting from stoppages. This process has the further disadvantage of a high first cost, a higher power cost than the absorption method, and needs a higher class man to run it.

### Albuquerque, New Mexico.

A dehydration plant installed at Albuquerque started operation on Aug. 29, 1927. The compression method was chosen, largely because of its simplicity and because results to be expected were somewhat familiar through experiences with high-pressure distribution.

Albuquerque is a town of 27,000 inhabitants. Its elevation is 5000 ft. above sea level. The climate is comparatively mild, with no long continued spells of severe weather. The thermometer has been known to touch zero and reaches 100° once in a while during the summer. It is necessary during an average winter to carry steam on the holder only 3 or 4 weeks.

A Worthington 15 in. by 14 in. horizontal compressor was installed. This is driven by a two-speed 7/25 H.P. motor. This compressor was located on the outlet side of the storage holders and discharged into three inter-connected compression tanks made up of three old boilers, for the purpose of giving enough storage to carry over the peaks. The compressor will handle 30,000 c.ft. of gas an hour.

Coal gas is manufactured in four benches of horizontal through retorts. The send-out runs from a maximum of 300,000 c.ft. to a minimum of 200,000.

| | Average Number of Consumers. |
|---|---|
| 1926 | 2358 |
| 1927 | 2548 |
| 1928 | 2847 |
| 1929 | 3077 |

A home-made after-cooler is installed between the storage tanks and the pressure regulator. This is made up of a 20-ft. length of 24-in. pipe containing 91 1-in. tubes through which the cooling water passes.

Compression carried from 30 lbs. per sq. in. to 50 lbs., the pressure building up to 50 lbs., and the compressor then automatically stopping until the pressure drops to 30 lbs., when it automatically starts up again.

The motor driving the compressor is run at half speed from 2 to 4.30 p.m. and from 7 p.m. to 7 a.m. The balance of the time it runs full speed. An oil fog apparatus was installed and about three gallons of oil per million c.ft. introduced.

A regulator at the outlet of the storage tanks reduces the pressure to the desired street pressure. At the present time it is 8 in. of water. At first it was 18 in.—the difference caused by the clearing up of mains and services.

The total cost of the installation was $14,428.16.

During the year 1929, 91,400,000 c.ft. of gas was compressed —this figure being after correction for loss of volume due to water vapour removed.

Gallons of condensate were 13,986, or 0·15 of a gallon per 1000 c.ft. An average of 18 p.ct. of this condensate is a light-coloured oil. The amount collected during the year 1929 was 2517 gallons. This is a 23° B. oil with an initial boiling point of 194° Fahr.

Results have been very satisfactory. In about two months the distribution system was fairly well dried out with dust instead of water present.

Poor pressure complaints for the 12 months preceding dehydration totalled 2388. For the first 12 months after dehydration the total was 1595. For the second 12 months after the total was 1223. At the present time poor pressure complaints are due to finely powdered rust and to a small amount of very dry naphthalene in almost a dust form. The dry gas passing through the mains picks up a certain quantity of naphthalene and carries it forward, causing a good many service stoppages. In time this condition will come to an end. It is no longer serious.

On Jan. 9 and 10, 1929—a year and four months after dehydration started—naphthalene tests showed the following:

| | | |
|---|---|---|
| Outlet of purifiers | 11·6 | grains per 100 c.ft. |
| Outlet of station meter | 4·424 | ,, ,, ,, |
| Inlet of distribution system | 0·886 | ,, ,, ,, |
| 0·5 miles from gas-works | 1·657 | ,, ,, ,, |
| 1·3 ,, ,, ,, | 2·116 | ,, ,, ,, |
| 2·2 ,, ,, ,, | 3·50 | ,, ,, ,, |

Maintenance of services and meters is much reduced. Just how much of the reduction should be credited to dehydration is rather hard to say, but it is estimated that at least half of it should be so credited. Meters and diaphragms are coming back to the shop in much better condition. Unaccounted-for gas increased somewhat after dehydration was inaugurated, but is now back below the point it was at that time.

In August, 1927, when dehydration began, unaccounted-for gas was 215,000 c.ft. per mile of 3-in. equivalent main per year. A year later it was 280,000 c.ft. Two years later it was 175,000 c.ft., while at the present time it is down to 165,000 c.ft. per year per mile.

The carrying capacity of the mains is much increased. Before dehydration it was necessary to run the booster a large portion of the time and to send the gas out over the peak hours at 18 in. water-column pressure. Now 8 in. pressure is sufficient. The most gratifying result, however, is the much improved service we have been able to give our customers and the greatly lessened volume of complaints of all kinds.

The cost of dehydration during the year 1928 was as follows:

| | |
|---|---|
| 169,840 KW.-H. of electricity at $0.0104 | $1766.33 |
| Labour at $1.00 per day | 365.00 |
| Lubricating oil and miscellaneous | 400.33 |
| Maintenance costs | 410.72 |
| Total | $2942.38 |
| Cost per 1000 c.ft.: 3.2 cents. | |
| Credit to dehydration— | |
| 2517 gallons oil at $0.05 | 125.85 |
| Cost of pumping drips eliminated | 324.00 |
| Labour running booster at $1.00 per day | 365.00 |
| 1165 less complaints at $1.75 | 2038.75 |
| Electricity used on booster 28,590 KW.-H. at $0.0104 | 297.34 |
| Lubricating oil, &c., on booster | 150.00 |
| Maintenance of booster | 100.00 |
| ,, ,, meters | 158.94 |
| ,, ,, services | 479.57 |
| ,, ,, mains | 545.26 |
| | $4584.71 |
| | 2942.38 |
| Net credit to dehydration | $1642.33 |

Balance for depreciation and interest, 11·3 p.ct. on cost of plant.

In addition, are the indirect benefits of longer life for meters, services, and mains on which no exact figure can be set.

### Tucson, Arizona.

Dehydration of the gas at Tucson was inaugurated on Sept. 19, 1928. The compression method was chosen, first, because of its simplicity, and, secondly, because the distribution system is designed to be fed from a belt line carrying whatever pressure may be necessary, making a compressor necessary in any case. The largest main in Tucson is 6 in. The total mileage of mains is 84—about two-thirds being of steel welded construction.

Tucson is a town of 32,500 inhabitants. Its altitude is 2400 ft. above sea level. The climate is mild during the winter and hot during the summer. Temperature ranges are from 25° to 120° Fahr., with an annual mean temperature of 64·1°. The climate is mild enough, so it is never necessary to carry any steam on the holders.

A 500-B.Th.U. oil gas is made. The average number of gas consumers were:

| | |
|---|---|
| 1925 | 3058 |
| 1926 | 3979 |
| 1927 | 3936 |
| 1928 | 4366 |
| 1929 | 4647 |

The send-out ranges from a maximum of a million c.ft. during the winter months to a minimum of 220,000 c.ft. during the summer. During the summer it is too hot either to cook or eat, which accounts for the slump in send-out at that time. In addition, a large part of the population departs for a cooler climate.

A Sullivan angle compressor was installed. This was designed to compress to 50 lbs. per sq. in.; speed, 320 r.p.m.; gas compressed per hour, 72,000 c.ft.

This is driven by a 150-H.P. Westinghouse synchronous motor by a Texrope drive belt.

The compressor was placed on the outlet side of the holders and discharges into a high-pressure holder with a capacity of 50,000 c.ft. at 50 lbs. pressure. After coolers were placed at both inlet and outlet of this holder. A governor reduces the

pressure as it enters the distribution mains to 2 lbs. at the present time. This pressure will be raised as the send-out increases.

The gas is compressed to 50 lbs. to the sq. in., when the compressor is manually stopped, and started again when the pressure reaches 30 lbs.

During the year 1929, 193,477,000 c.ft. of gas was dehydrated and 13,468 gallons of condensate recovered, or 0·061 gallon per 1000 c.ft. Almost no oil is found in the condensate. The after cooler at the inlet of the high-pressure holder is drained about twice a month and much naphthalene removed.

Results have been about as expected. The distribution system appeared to be completely dried out in about three months, at which time only powdered naphthalene and fine iron rust was found in the mains and services. This dust is responsible for most of the low-pressure complaints now being had and is a condition which time will end. Poor pressure complaints for the 12 months prior to dehydration totalled 3178. Similar complaints for the year 1929 totalled 1516—a difference of 1662 in favour of dehydration.

Unaccounted-for gas during the 12 months prior to dehydration was 475,000 c.ft. per mile per year of 3-in. equivalent main. The first 12 months after beginning dehydration it was 335,000 c.ft. per mile per year, and at the present time is 240,500 c.ft. It is apparent that there is no increase in leakage due to dehydrating manufactured gas.

The cost of the dehydrating plant was $21,435.87. This included the building housing the compressor and the 50,000 c.ft. high-pressure storage holder.

The cost of dehydration during the year 1929 was as follows:

| | |
|---|---|
| 231,375 KW.-H. at $0.02 | $4627·50 |
| Labour at $1.00 per day | 365.00 |
| Maintenance costs | 419.19 |
| Lubricating oil | 156.98 |
| Miscellaneous | 150.00 |
| Total | $5718.67 |
| Cost per 1000 c.ft. : 2.95 cents. | |
| Credit to dehydration— | |
| 1662 less complaints at $1.75 | $2908.50 |
| Pumping drips | 416.00 |
| Labour, running booster, at $1.00 per day | 365.00 |
| Steam for booster estimated | 1200.00 |
| Maintenance of booster | 275.00 |
| Lubricating oil for booster | 110.00 |
| Miscellaneous on booster | 125·00 |
| | $5399.50 |

That is, during 1929 there was an operating loss of $319.17. The year 1930 will begin to show a profit on the installation. In addition, however, it lessened maintenance of mains, services, and meters, which at this time can be guessed at only, and the increased life of mains, services, and meters which will take much time before its value in dollars and cents can be known. The greatest benefit, however, is the diminished troubles of the customer with the gas, and, in consequence, a much better feeling towards the gas company.

# The Chlorine Content of Coal, and its Distribution in the Products of Carbonization*

**Published by permission of the Controller of H.M. Stationery Office**

When coals are carbonized, the bulk of the contained chlorine is volatilized as hydrochloric acid, which, of course, combines with ammonia to form ammonium chloride. Experiments in this laboratory have shown that, under laboratory conditions, 90 to 95 p.ct. of the chlorine contained in the coal is driven off. That this figure is approximately valid for large scale operations is borne out by analyses of coke from coke ovens, which contain traces only of chlorine. Analyses of coal in use at gas-works and of the resulting coke show that here about two-thirds of the contained chlorine is volatilized.

For each 0·1 p.ct. of chlorine driven off there is formed ammonium chloride equivalent to 3·37 lbs. per ton of coal. This is equal to 4·15 lbs. of sulphide of ammonia per ton. When one reflects that the recovery of ammonia in gas-works is about 20 lbs. (as sulphate of ammonia) per ton of coal, it is clear that the ammonium chloride usually bears a considerable proportion to the total.

In usual practice this is decomposed by lime in the ammonia still with the formation of free ammonia and calcium chloride, the former being neutralized with sulphuric acid to form sulphate of ammonia. Under present conditions of the bye-product ammonium sulphate manufacture one is led to wonder whether at any rate an appreciable amount of the chloride could be recovered as such. Such a plan is attractive in that it would not only relieve the ammonia stills and reduce the bulk of the effluent, but would also effect economy by reason of the reduced liming necessary. There would also be, of course, a corresponding reduction in the consumption of vitriol.

We have been led to think that it would be worth while to investigate the question of the amount of chloride actually existing at various stages, beginning with coal and continuing through the products obtained by its carbonization.

Most of the ammonium chloride is removed from coal gas at an early stage in the condensation system, and is therefore found in the tar and in the earlier liquor condensates.

Smith and Pearson ("Modern Gas Practice," A. Meade, Benn Bros., 1921, p. 273) ascertained that the principal binding material in pitchy deposits of the hydraulic main consists of ammonium chloride, and they eliminated this by having a water layer on the tar. The same result can be obtained by means of hot water sprays at this early stage when free ammonia is not taken up to any appreciable extent by reason of the temperature.

Dr. Parker, in a paper read recently to the Institute of Gas Engineers, says—in speaking of coke oven practice—"To aid in the extraction of tar fog and to remove ammonium chloride, hot liquor is usually sprayed into the tar extractors. The hot liquor is then separated from the heavier tar and re-circulated until it attains the desired concentration of ammonium chloride—about 20 p.ct.—when it is sold as concentrated fixed ammonia liquor or is evaporated for the production of crude ammonium chloride containing less than 2 p.ct. of ammonium sulphate."

By courtesy of the Wombwell Coke & Bye-Product Company, Ltd., I am permitted to describe shortly the very complete system in use at their works for removal of ammonium chloride prior to direct sulphate recovery.

The crude gas is treated with a liquor spray and then passes through a cyclone, which is also provided with a liquor spray, the liquor in both cases running to a circulating tank. A third spray after the cyclone is supplied with fresh water, and this removes a further amount of ammonium chloride. Circulation is continued until the liquor contains about 15 p.ct. of ammonium chloride, when it is withdrawn for evaporation.

Yorkshire coal with an average of 0·103 p.ct. of chlorine on a dry basis is used—equivalent to 3·47 lbs. of ammonium chloride per ton of coal. The average recovery of ammonium chloride is 3 lbs., or about 86 p.ct. of the total as given by the analysis of the coal. The average recovery of sulphate of ammonia in the subsequent direct plant is 25 lbs. per ton of coal, and so the ammonia recovered as chloride amounts to 14 p.ct. of the total. The recovered ammonium chloride contains about 5 p.ct. of sulphate.

Congdon pipes and Dempster-Toogood descension pipes, as recently introduced into gas-works, have a similar action in removing ammonium chloride from the crude gas without removing any considerable amount of the free ammonia.

Liquors from Congdon pipes at two different works have been found to contain 5·0 p.ct. and 8·0 p.ct. of ammonium chloride and only 0·1 p.ct. and 0·2 p.ct. of free ammonia. The same sort of thing takes place in the newer types of vertical retort systems where water sprays are used in the hot gas main; but in these cases there is generally more free ammonia owing to the lower temperature of the gases.

At a coke oven works using Yorkshire coal containing chlorine equivalent to 3·6 lbs. of ammonium chloride per ton, we found 2·2 lbs. of ammonium chloride per ton in the liquor from the water-tube condensers and only 0·1 lb. in the subsequent scrubbers. The balance of the volatilized chlorine was doubtless in the hydraulic main tar.

The results of analyses show that the ammonium chloride is almost entirely removed at an early stage in the purification, the major portion being in the retort house liquor. The crude gas leaving the condensers contains traces only of ammonium chloride.

In some instances the liquor which is circulated through the hydraulic main is derived from the main storage tank and is returned thither. In such cases the supply is nearly cold and much steam is condensed thereby rendering the liquor weaker in ammonium chloride than would be the case if it were utilized over and over again in a hot condition and withdrawn from circulation only when the ammonium chloride content reached suitable proportions.

* From the 66th Annual Report on Alkali, &c., Works (H.M. Stationery Office, price 6d. net).

From information received, one is led to think that probably a very much larger volume of spraying liquor is sometimes used than is actually necessary. A lesser quantity, it is thought, would remove deposit from the main equally well and would result in a higher ammonium chloride content.

Moreover, it seems scarcely reasonable to utilize, in the hydraulic main, storage liquor which contains free ammonia, hydrogen sulphide, and carbon dioxide, for these constituents are almost wholly driven off and pass again into the gas stream, thus throwing additional work on to the purifying system.

Attempts have been made in the laboratory to obtain some idea as to the yield and purity of ammonium chloride that can be obtained by evaporation of hydraulic main liquors. The cost of evaporation should not be too great, for waste heat could quite well be applied for this purpose.

During last year, 2774 tons of ammonium chloride were imported into Great Britain; there should therefore be a ready market for home-produced material.

Experiments were made on a sample of liquor from the hydraulic main of a vertical retort setting. The liquor was dark brown in colour and contained considerable quantities of phenols and the so-called higher tar acids. Its percentage composition (wt/vol) in so far as inorganic constituents are concerned was as follows:

| | |
|---|---|
| Free ammonia | 0·2 p.ct. |
| Ammonium chloride | 14·7 ,, |
| ,, thiocyanate | 1·0 ,, |
| ,, thiosulphate | 1·0 ,, |
| ,, sulphate | 0·5 ,, |
| ,, sulphide | traces |
| ,, cyanide | ,, |

The first experiments were carried out to determine the purity of the salt obtained by evaporation, under comparable conditions, to varying degrees. For this purpose 300 c.c. quantities were evaporated to various volumes on the steam bath and the ammonia content of the resultant crystals determined in the usual manner. The results are tabulated below:

*Volume of Solution, 300 c.c ; equivalent to 44 grammes $NH_4Cl$.*

| Volume of Mother Liquor (C.C.). | Weight of Crystals (Grammes). | $NH_3$ (Dry Basis) in Crystals, P.Ct. |
|---|---|---|
| 145 | 7 | 30·8 |
| 95 | 21 | 30·3 |
| 70 | 29 | 29·6 |
| 60 | 31 | 29·2 |

The crystals were initially of extremely good colour, but after keeping for a few days began to darken, and eventually became purplish-brown, the intensity of the colour increasing with decreasing ammonia content.

Since pure ammonium chloride contains 31·77 p.ct. of ammonia it is at once apparent that there is present in all cases a considerable proportion of impurity. From the behaviour of the crystals towards light and towards reagents it was concluded that the bulk of the impurities were phenolic in character and belonged to the class of substances conventionally referred to as higher tar acids.

In so far as inorganic impurities are concerned the samples of recovered salts were quite good. The salt containing 29·2 p.ct. of ammonia contained 0·6 p.ct. of ammonium sulphate, 0·3 p.ct. of ammonium thiocyanate, and traces only of ammonium thiosulphate.

The impurities present in the darkened salts are either insoluble or very sparingly soluble in the majority of common solvents. Of these only pyridine is capable of their almost complete removal, the resulting salt after extraction with pyridine being white and containing 31·6 p.ct. of ammonia. No darkening in colour occurs even after keeping several months.

The foregoing experiments having established that by simple evaporation on the steam bath a crude salt only is obtained, further experiments were undertaken to determine whether by modifying the conditions of evaporation or by pre-treatment of the liquor to be evaporated it would be possible to obtain a purer salt. With this end in view 250 c.c. quantities, equivalent to 37 grammes of ammonium chloride, were evaporated, under various conditions, to a volume of 50 to 60 c.c., the weight of the recovered salt being of the order 25 to 28 grammes. The salt obtained by simple evaporation on the steam bath contained 29·8 p.ct. of ammonia on a dry basis and underwent considerable darkening on keeping.

On evaporation by actual boiling, and the consequent attainment of a rather higher temperature, more of the phenolic constituents normally crystallizing out with the ammonium chloride were volatilized, and the resulting salt contained 30·7 p.ct. of ammonia. The colour became dark on keeping, but not to the same extent as in the previous case.

Treatment with a stream of coal gas at 100° C. prior to the evaporation by boiling had no effect on the purity of the final salt, the ammonia content of which, 30·6 p.ct., was practically unaltered. It is therefore apparent that volatilization of phenols, &c., by treatment with a gas stream prior to evaporation is unnecessary, such monohydric phenols as are present being volatilized during the evaporation.

On evaporation by boiling of a faintly acid solution the resulting salt had a slightly higher ammonia content, 31·1 p.ct., and was of rather better colour. The increased purity would suggest that a portion of the free ammonia in the original liquor is present as the ammonium salt of higher tar acids. These acids are very weak, and the ammonia so combined would be titratable.

In agreement with experiments with the faintly ammoniacal liquor, pre-treatment with a stream of coal gas had practically no influence on the ammonia content, 31·2 p.ct., of the recovered salt. Extraction of the faintly acid liquor with benzene prior to evaporation by boiling considerably improved the colour of the liquor, but the ammonia content of the recovered salt—31·3 p.ct. —was little affected.

It was shown in the Sixty-fifth Report, 1928, p. 23, that tar acids of the catechol—*i.e.*, *o*-polyphydroxy type—are almost quantitatively removed by agitation of the liquor with lead carbonate. A 250 c.c. quantity of liquor was therefore agitated with lead carbonate (50 grammes) for an hour and the filtered liquor evaporated by boiling. The resulting crystals, although darkening slightly on keeping, were the best yet obtained and contained 31·6 p.ct. of ammonia. Comparing this figure with that obtained in the absence of any previous treatment—30·7 p.ct.—it is at once apparent that diminution in the higher tar acid content and increase in the purity of the recovered salt go hand in hand.

That the presence of lower phenols has little influence on the purity of the recovered salt is shown by the results of the following experiments in which 250 c.c. of a solution containing 37 grammes of ammonium chloride and also 5 grammes of phenol in one case, and 5 grammes of catechol in the other, were evaporated by boiling to a volume of about 60 c.c. The ammonia content of the salt recovered from the solution containing phenol was 31·7 p.ct., and that of the salt from the solution containing catechol was 31·2 p.ct.

Summarizing the results of these experiments, it may be safely asserted that by acidification and evaporation by boiling of hydraulic main liquors at maximum strength it is possible to recover ammonium chloride containing 1 to 2 p.ct. of higher phenols. Were it possible to reduce the higher tar acid content of the liquor in any way, there would be a consequent improvement in the purity of the recovered salt.

Flushing of the hydraulic main and consequent washing out of ammonium chloride is of benefit also in that the ammonium chloride content of the tar is thereby reduced. Experience has, however, shown that even a small proportion of ammonium chloride in tar has a most detrimental effect on tar stills.

When adequate washing has been effected in the hydraulic main, the ammonium chloride content of the tar is in the form of an aqueous solution emulsified with the tar, and reduction in the liquor content of the tar, effected by settlement or by centrifugal or other physical means, effects a proportional reduction in the ammonium chloride content.

A sample of tar entering a centrifugal tar dehydrator was found to contain 30 p.ct. (by volume) of liquor and 0·30 p.ct. of ammonium chloride. The tar leaving the apparatus contained 6 p.ct. (by volume) of liquor, and the ammonium chloride content was reduced to 0·05 p.ct. A sample of tar from a Congdon pipe system was found to contain 0·54 p.ct. of ammonium chloride. The sample was placed in a bath of boiling water for 4 hours and then allowed to cool overnight and the separated liquor run off. The ammonium chloride content of the tar remaining was 0·05 p.ct.

Once ammonium chloride is deposited in the tar in a solid form, it is very difficult to remove by washing.

# REGISTER OF PATENTS

## Pressure-Loaded Governors.—No. 330,435.

SIMPSON, J. F., of Scunthorpe, and PEEBLES, W. C., and PEEBLES & CO., LTD., both of Edinburgh.

No. 21,946; July 17, 1929.

This invention, which relates to pressure-loaded gas governors, is a further development of that described in Specification No. 297,166 (see "JOURNAL," Vol. 184, p. 277). The device described in that specification includes a main governor incorporating a movable member, preferably in the form of a bell, connected to the main governor valve, and associated with an auxiliary governor; the weight of the bell and valve being over-counterbalanced to maintain a higher pressure above the bell than in the outlet main.

According to the present invention, to avoid loss of gas and to simplify the arrangement, an injector is incorporated in the connection leading from the top of the said bell to the outlet main. The power to operate the injector is obtained by leading thereto a small supply of gas from the inlet side of the main governor, where the pressure is always higher than the outlet pressure. By this means the gas is drawn from the top of the main governor bell chamber and forced into the outlet main.

The greater the difference between the inlet pressure and the pressure thrown by the main governor, the greater will be the injector action, compensation being provided by the auxiliary governor, which, being adjusted to a certain pressure, opens more or less to maintain the static pressure conditions required on the top of the main governor bell.

## Manufacture of Sulphate of Ammonia. No. 330,945.

ADAM, W. G., of Loughton, MURDOCH, D. G., of Cricklewood, N.W. 2, and the GAS LIGHT AND COKE COMPANY, of Horseferry Road, Westminster, S.W. 1.

No. 9050; March 20, 1929.

The following claims are made for this invention:

1. The method of producing sulphate of ammonia showing little or no tendency to cake on standing in which a solution obtained by double decomposition of ammonia, carbon dioxide, and calcium sulphate is caused to crystallize in presence of a small quantity of a metallic salt conducive to the formation of crystals of elongated form and a small quantity of free acid so as to produce robust crystals of relatively uniform size having in bulk a high percentage of voids.
2. The method as claimed in claim 1 in which a ferric salt is employed.
3. In the crystallization of sulphate of ammonia obtained by double decomposition of ammonia, carbon dioxide, and calcium sulphate, the method of producing robust crystals of elongated form by adding to the solution a small proportion of a ferric salt.
4. In the crystallization of sulphate of ammonia obtained by double decomposition of ammonia, carbon dioxide, and calcium sulphate, the method of producing a product having in bulk a high proportion of voids by conducting the crystallization at a substantially uniform rate in presence of a small proportion of a ferric salt and a small proportion of free acid.
5. The method as claimed in any of the preceding claims in which a quantity less than about 1 p.ct. of free sulphuric acid is present in solution.
6. The method as claimed in any of the preceding claims in which the quantity of metallic salt is less than about 1 p.ct. calculated as metal upon the sulphate of ammonia.
7. The method as claimed in any of the preceding claims in which the crystallization is effected at a controlled uniform rate at constant temperature.
8. The method as claimed in claims 1 to 6 in which the solution is cooled slowly with agitation during crystallization.
9. The method as claimed in claim 8 in which the rate of cooling does not exceed about 0·42° C. per minute.
10. The method as claimed in any of the preceding claims in which there is present in the solution a substance or substances capable of modifying the chemical composition or state of oxidation of the added metallic salt so as to facilitate the production of crystals of the desired form.

## Coin-Freed Mechanism.—No. 331,049.

BINGHAM, J. H., of Dorney Common, and GLOVER, GEORGE, & Co., Ltd., of Chelsea.

No. 15,048; May 14, 1929.

This invention relates to improvements in coin-freed mechanism of the kind comprising a coin receiving pocket adapted to receive coins of different sizes and to retain each coin therein in an appropriate position according to its size, such that coins of one size engage with a corresponding wheel, the coin forming a connection between this wheel and the coin pocket so that movement of the coin pocket effects the driving of a train of gearing corresponding to the size of the coin inserted. Mechanism of this kind is applicable to gas meters to effect a setting of mechanism controlling the supply valve in accordance with the value of the coin inserted.

An object of the present invention is to provide an arrangement of the coin pocket and associated parts, preventing the insertion into the coin pocket of more than one coin at a time.

When the coin receiving pocket is in the coin receiving position below a coin slot in the casing, a shelf or like projection on a suitable frame part projects across the coin pocket so as to support the coin then first inserted in the pocket, and prevents this coin from descending so far that a second coin can be inserted. As the coin pocket is moved away from the coin receiving position the coin is drawn off the shelf and allowed to descend in the coin pocket to the appropriate position, to engage the corresponding wheel that it is required to drive.

Also there is provided either in combination with or in substitution for the shelf above referred to, a swinging bar carrying pins which in the normal position of the bar, the coin pocket being empty, extend into the coin space within the said pocket through holes in the wall thereof. When a coin is inserted in the pocket, the coin presses against one or another of the said pins, according to the size of the coin and its position in the pocket, thereby swinging the bar to a new position in which a stop plate or pin carried on the bar is brought to a position closing the entrance into the pocket for coins, so that no further coins can be inserted into the coin pocket until it has been emptied.

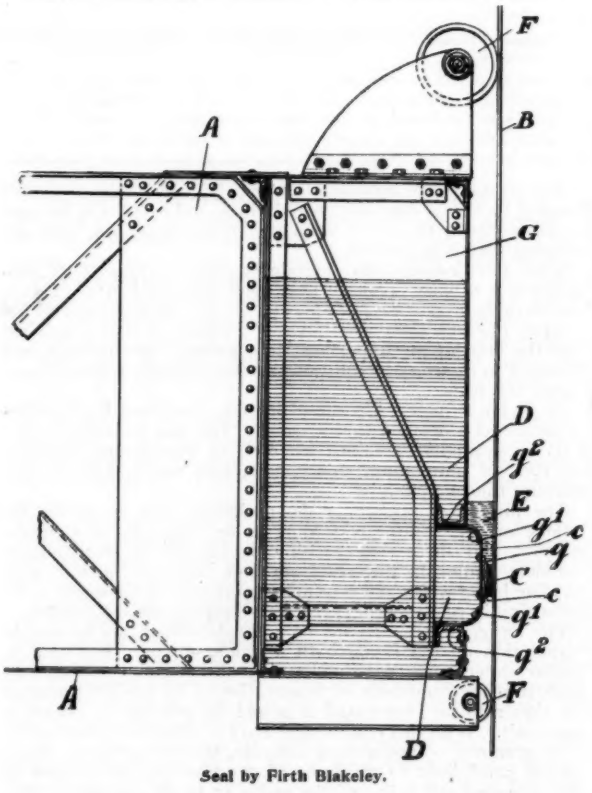
## Waterless Gasholders.—No. 331,266.

BLAKELEY, W., and FIRTH BLAKELEY, SONS, & CO., LTD., both of Church Fenton.

No. 9486; March 25, 1929.

This invention relates to waterless holders in which a pad on a piston is maintained in contact with the gasholder shell by internal liquid or air pressure. The pad (or pads) is carried by a ring of canvas, rubber, leather, or similar flexible material. The accompanying diagram is a vertical section of part of a gasholder piston constructed in accordance with the invention. A indicates the piston, and B the gasholder shell, C the annular pad or pads, D the liquid under pressure for causing the latter to make a pressure-tight joint with the shell of the gasholder, E the lubricating liquid, and F the anti-friction bearings.

The piston may be of the usual plate or lattice structure with




Seal by Firth Blakeley.

the whole of the base plated and rendered gas-tight. The outer circumferential part of the piston may be made in the form of an annular tank G having an annular opening *g*.

In the example shown the opening is bounded at the top and bottom by curved plates $g^1$ which project somewhat beyond the peripheral portion of the annular tank G. Clamped in position between these plates and channel irons $g^1$ is a flexible ring *c* which seals the opening *g* and is constructed from canvas, rubber, leather, or other similar fluid-tight material; and attached to such flexible ring are the pads C, which may be constructed from felt, leather, canvas, asbestos, or other suitable material, which for wear-resisting surfaces may be reinforced with wire insertion which can be secured to the flexible ring by sewing or by bolts. These pads are maintained in gas-tight contact with the outer shell B of the gasholder by the liquid D under pressure in the annular tank G, which forces the flexible ring *c* outwardly and so presses the pads against the shell of the gasholder. E indicates a body of oil, tar, or other suitable

liquid to provide an efficient lubricant for the pads and reduce friction between them and the shell of the gasholder. If any lubricant leaks past the pad it may be deflected by a drip plate and prevented from creeping under the piston, the oil so deflected dripping to the bottom of the gasholder, where it is collected by a suitable drain, and, after being filtered, can again be used. To help to keep the shell of the gasholder from distortion, due to wind pressures, and thereby to reduce the wear on the pads and the danger of the piston jamming, anti-friction bearings such as wheels F are mounted at the top and bottom of the piston. Additional anti-friction wheels supported well above the top of the piston by brackets may be employed to prevent or reduce tilting of the piston. If desired balls or rollers may be substituted for the wheels F, in which case they may be placed in a continuous race, or mounted in separate brackets situated in proximity to each other and round the circumference of the piston.

## Applications for Patents.

**[Extracted from the "Official Journal" for July 16.]**

Nos. 20,474—21,197.

JOHNSON, J. Y. (I. G. FARBENINDUSTRIE AKT.-GES.).—"Apparatus for drying and low-temperature carbonization." No. 20,543.
JOHNSON, J. Y. (I. G. FARBENINDUSTRIE AKT.-GES.).—"Apparatus for low-temperature carbonization." No. 21,101.
PARKINSON & COWAN (GAS METERS), LTD.—"Gas meters." No. 21,192.
PREMIX GAS PLANTS, LTD.—"Presses." No. 20,770.
THORP, F.—See Parkinson & Cowan (Gas Meters), Ltd. No. 21,192.

**[Extracted from the "Official Journal" for July 23.]**

Nos. 21,198—21,924.

GAS METER COMPANY, LTD.—"Prepayment mechanisms." No. 21,324.
HOLOPHANE, LTD.—"Street-lighting glassware." No. 21,297.
KOPPERS AKT.-GES., H.—"Regenerative coke ovens." No. 21,569.
KOPPERS COMPANY.—"Sealing materials for gasholders." No. 21,911.
NAAMLOOZE VENNOOTSCHAP SILICA EN OVENBOUW MIJ.—"Apparatus for charging carbonizing chambers." No. 21,822.
RADIATION, LTD.—"Automatic gas valves." No. 21,647.
SOUTH METROPOLITAN GAS COMPANY.—"Load-supporting apparatus." No. 21,308.
YATES, H. J.—See Radiation, Ltd. No. 21,647.

# Parliamentary Intelligence.

**[From Our Special Correspondents.]**

## House of Lords.

**Private Bills.**

The South Yorkshire and Derbyshire Gas Bill has been returned from the Commons with the amendments agreed to.

The Ascot District Gas and Electricity Bill and the Brixham Gas and Electricity Bill have been returned from the House of Commons with amendments. The amendments have been considered and agreed to.

**Special Orders.**

The Colchester Gas Order and the Farnham Gas Order, having been passed by the Special Orders Committee, have been approved by the House. The Special Orders Committee meets to-morrow to consider the Tottenham and District Gas Order.

Special Orders on the application of the City of Stoke-on-Trent and the Yorktown-Camberley District Gas and Electricity Company have been laid before the House and referred to a Special Orders Committee.

## House of Commons.

**Private Bills.**

Petitions have been presented by Messrs. Sherwood & Co., on behalf of the Gas Light and Coke Company, against the River Lee Flood Relief Bill and the West Ham Corporation Bill.

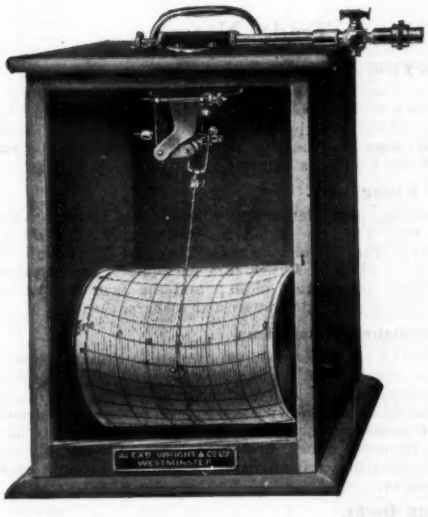
The opposition to the Hartlepool Gas and Water Bill having been withdrawn, it was referred to the Unopposed Bills Committee, which reported it with amendments, and has now been considered as amended, read a third time, and passed, with amendments.

**Special Orders.**

The Special Orders made on the application of the Colchester Gas Company and the Farnham Gas and Electricity Company have been approved by the House.

Special Orders on the application of the City of Stoke-on-Trent and the Yorktown Camberley District Gas and Electricity Company have been presented and ordered to lie upon the Table.

PRESSURE & VACUUM GAUGES



RECORDING—INDICATING

THE series of Simmance Patent 'Dead-Beat' Recorders and Indicators offers a choice of form and range such that practically every requirement in every branch of the Gas Industry can be met.

**Minimum - 1" w.g. Maximum - 400 lbs. per sq. inch.**

*Illustration shows 'Large Scale' Drum Recorder, fitted with chart 6" wide (equal to a 14" disc chart) and 19" in length.*

*Approved by Gas Referees.*

ALEXANDER WRIGHT & CO., LTD.,
1 Westminster Palace Gardens, Victoria St., London, S.W.1.

# GAS MARKETS & MANUFACTURES

## Stock Market Report.

### [For Stock and Share List, see later page.]

Business in most markets on the Stock Exchange last week was on a reduced scale, and prices depreciated in consequence. Apart from the usual interest in a few specialities and the recent new issues, the tone generally was weak. Even British Funds were no exception to the general depression, and opened the new Account with a sharp fall in prices, most of which, however, was recovered by the close on Friday. With the near approach of the holiday season there appears to be little prospect of any appreciable improvement in the near future.

There is little cause for pessimism, however, in the Gas Market. Prices continue to be well maintained, and for some time past the general tendency has been towards an improvement in values. Last week Wandsworth ordinary rose 2 points to 109½; and on the local Exchanges, Liverpool ordinary gained ⅜ and South Shields consolidated ½ to 93¼ and 107¼ respectively. There were the usual *ex* div. reductions for this time of the year, and a fall of 1s. to 18s. in the £1 shares of the Colonial Gas Association, Ltd.

For those requiring permanent high-class investments, attention is drawn to the ordinary stocks of those companies which have just gone *ex* div. Among these are the following:

| — | Present Price. | Dividend. 1929. | Yield P.Ct. per Annum. |
|---|---|---|---|
| | | P.Ct. | £ s. d. |
| Cardiff | 95½ | 6 | 6 5 7 |
| Commercial | 93½ | 6 | 6 8 4 |
| Gas Light £1 units | 19s. | £5 12s. | 5 17 10 |
| Newcastle £1 units | 15s. 10½d.* | £5 7s. 6d. | 6 15 5 |
| South Suburban | 101½ | 6¼ | 6 8 0 |
| Tottenham | 102 | £6 12s. 6d. | 6 9 10 |

*On the Newcastle Exchange.

## Coal Markets.

There is little change from the stagnation of recent months, except perhaps that the markets are settling down to the lower standard of trade and values. Production has become more or less adjusted to the demand, and it is probably this, rather than any actual improvement in business, which has induced a slightly more hopeful feeling in some directions.

Now that the Coal Mines Bill is to go through, all energies will have to be concentrated upon the completion of the marketing schemes, which apparently must come into action somewhere about December. Buyers of coal, and especially home consumers, will be anxiously awaiting details. In other respects there will be relief that the long drawn-out preliminaries are finished, because, although, of course, there are other causes of the slump, foreign buyers have undoubtedly held off to some extent with the idea of seeing what they are to get out of the marketing schemes—at the expense, they hope, of the British consumer.

Durham gas coals appear to be more or less stabilized at recent levels. Wear specials quote 15s. 6d. f.o.b., and bests 14s. 9d. to 15s. While some seconds quote down to 12s. 9d., a few more are making a stand at 13s. The undertone in this department is, if anything, slightly steadier. Gas coke all round is quiet, but steady. Heavy winter demands for export are anticipated, and the price holds firm at about 21s. 6d.

## Current Sales of Gas Products.

### The London Market for Tar, Tar Products, and Sulphate.

LONDON, *July* 28.

Prices of tar products remain steady, and there are no changes to report during the past week.

Pitch is 47s. 6d. per ton f.o.b.

Creosote for export remains at 6d. to 6¼d. per gallon.

Pure toluole is 2s. 2d. to 2s. 3d.; pure benzole, 1s. 10d. to 1s. 11d.; and 95/160 solvent naphtha, 1s. 5d. to 1s. 6d.—all per gallon *ex* sellers' works.

Pyridine bases are still about 3s. 9d. per gallon *ex* sellers' works.

### Tar Products in the Provinces.

*July* 28.

The average prices of gas-works products during the week were: Gas-works tar, 20s. to 24s. Pitch—East Coast, 46s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 46s. f.o.b.* Toluole, naked, North, 1s. 7¼d. to 1s. 8¼d. Coal-tar crude naphtha, in bulk, North, 9d. to 10d. Solvent naphtha, naked, North, 1s. 3d. to 1s. 3½d. Heavy naphtha, North, 1s. to 1s. 0½d. Creosote, in bulk, North, liquid and salty, 3½d. to 3⅝d.; low gravity, 1½d.; Scotland, 3¼d. to 3⅝d. Heavy oils, in bulk, North, 5½d. to 6d. Carbolic acid, 60's, 2s. to 2s. 1d. July/December. Naphthalene, £12 to £14. Salts, £5 to £5 10cs., bags included. Anthracene, "A" quality, 2½d. per minimum, 40 p.c., purely nominal; "B" quality, unsaleable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port, it will be necessary to deduct the loading costs and the tolls whatever they may be.

### Tar Products in Scotland.

GLASGOW, *July* 26.

There is still no improvement to report in market conditions in this area. Motor benzole has fallen in price during the week owing to the lack of demand for prompt delivery.

Pitch.—Lower prices are being quoted for forward shipment, and value is now about 45s. to 47s. 6d. per ton f.o.b. Glasgow. Quotations for home business remain at 47s. 6d. per ton free on rails works.

Refined tar.*—The demand is steady, and makers' quotations remain firm at 3¼d. to 3⅜d. per gallon f.o.r. in buyers' packages.

Creosote.—Trading is dull, and prices are easy. B.E.S.A. specification is 3¼d. to 3⅜d. per gallon; low gravity is 3d. to 3⅛d. per gallon; neutral oil is 3d. to 3⅛d. per gallon—all f.o.r. works in bulk quantities.

Cresylic.—More frequent inquiries are noticeable, and value is unchanged. Pale 97/99 p.ct. is 1s. 8d. to 1s. 9d. per gallon; dark 97/99 p.ct. is 1s. 7d. to 1s. 8d. per gallon; pale 99/100 p.ct., 1s. 10d. to 1s. 11d. per gallon—all *ex* makers' works.

Crude naphtha remains steady at 4¼d. to 4⅜d. per gallon *ex* makers' works in bulk.

Solvent naphtha.—Small quantities are changing hands, but values remain easy. 90/160 grade is 1s. 2½d. to 1s. 3⅛d. per gallon, and 90/190 grade is 1s. to 1s. 1d. per gallon.

Motor benzole.—Orders are scarce, and quotations are lower at 1s. 5⅜d. to 1s. 6¼d. per gallon.

Pyridines remain very quiet. 90/160 quality is nominal at about 3s. to 3s. 3d. per gallon.

### Benzole Prices.

The following are considered to be the market prices at the present time:

| | s. d. | s. d. | |
|---|---|---|---|
| Crude benzole | 0 10 | to 0 11 | per gallon at works |
| Motor ,, | 1 5½ | ,, 1 6½ | ,, ,, ,, |
| Pure ,, | 1 10 | ,, 1 11 | ,, ,, ,, |

* This is refined coal tar prepared to Ministry of Transport Specification No. 1 or No. 2. It must not be confused with crude tar.

## Trade Notes.

### Coal Cleaning Plant for Tinsley Park Colliery.

The Clean Coal Company, Ltd., have received an order from the Tinsley Park Colliery Company, Ltd., of Sheffield, for a plant to treat their coking coal by the "Clean Coal" patent de-dusting process. This plant will be capable of dealing with the whole requirements of the Colliery's bye-product coke ovens.

### Duckham's "Easing" Oil.

An interesting pamphlet recently issued by Messrs. Alexander Duckham & Co., Ltd., of Broad Street Place, E.C. 2, deals with the important question of rust, its prevention and destruction. Duckham's "Easing" oil, it is stated, is a particularly useful product to have handy when dismantling plant; and the firm will be glad to send copies of the pamphlet to interested readers.

### Blackman Ventilating Installations.

A new booklet recently published by the Blackman Export Company, Ltd., of 374, Euston Road, N.W. 1, deals with some of the firm's apparatus for industrial and public building ventilation. A large range of installations for a wide variety of purposes is depicted in pictorial form, among which are systems for the ventilating of workshops, ships, theatres, mines, and tunnels, together with forge and foundry plant, dust and refuse removers, induced draught fans, and flue dust arresters.

### Plant for Leith Docks.

The Pulsometer Engineering Company, Ltd., of Reading, have recently secured the contract for the hydraulic pumping plant for Leith Docks. The plant is to consist of two sets for 800 gallons per minute and one for 600 gallons per minute, each discharging against a pressure of 800 lbs. per sq. in. The motors are to be suitable for operating on a 6600-volt supply. In addition, a return water pump and feed tanks, two venturi tubes, piping, and valves are to be supplied. The motors will be by Messrs. Bruce Peebles & Co., Ltd., and the control gear by the Electric Control Company, Ltd.

# STOCK AND SHARE LIST.

[For Stock Market Report, see earlier pages.]

| Issue. | Share. | When ex-Dividend. | Dividends. Prev. Hf. Yr. | Dividends. Last Hf. Yr. | NAME. | Quotations. July 25. | Rise or Fall on Week. | Transact'ns Lowest and Highest Prices During the Week. |
|---|---|---|---|---|---|---|---|---|
| £ | | | % p.a. | % p.a. | | | | |
| 171,978 | Stk. | Feb. 6 | 5 | 5 | Aldershot 5 p.c. max. C. . | 73—78 | .. | .. |
| 522,992 | ,, | ,, | 4 | 4 | Do. 4 p.c. Pref. . . | 70—73 | .. | .. |
| 1,551,868 | ,, | Apl. 3 | 7⅜ | 7⅜ | Alliance & Dublin Ord. . . | 93—96 | .. | .. |
| 374,000 | ,, | July 10 | 4 | 4 | Do. 4 p.c. Deb. . . | 60—63 | .. | .. |
| 522,655 | ,, | Mar. 6 | 7 | 7 | Barnet Ord. 7 p.c. . . . | 109—112 | .. | .. |
| 300,000 | 1 | Apl. 24 | 1/4⅛ | 1/7⅛ | Bombay, Ltd. . . . . | 16/—18/- | .. | .. |
| 174,500 | 10 | Mar. 6 | 9 | 9 | Bournemouth 5 p.c. . . . | 14—15 | .. | 14⅞—14½ |
| 500,050 | 10 | ,, | 7 | 7 | Do. B 7 p.c. . . | 12½—12⅝ | .. | £12/10/6 |
| 439,160 | 10 | ,, | 6 | 6 | Do. Pref. 6 p.c. . | 10½—11½ | .. | .. |
| 50,000 | Stk. | June 26 | 3 | 3 | Do. 3 p.c. Deb. . | 54—57 | .. | .. |
| 162,025 | ,, | ,, | 4 | 4 | Do. 4 p.c. Deb. . | 72—75 | .. | .. |
| 357,900 | ,, | Mar. 20 | 7½ | 7½ | Brighton & Hove 6 p.c. Con. | 114—117 | .. | 115½—115⅝ |
| 871,880 | ,, | ,, | 6½ | 6½ | Do. 5 p.c. Con. | 102—105 | .. | .. |
| 1,287.500 | ,, | July 24 | 5 | 5 | Bristol 5 p.c. max. . . . . | 88—89a* | −1 | .. |
| 855,000 | ,, | Apl. 3 | 7 | 8 | British Ord. . . . . | 110—115 | .. | .. |
| 100,000 | ,, | June 26 | 7 | 7 | Do. 7 p.c. Pref. . . . . | 112—117 | .. | .. |
| 120,000 | ,, | ,, | 4 | 4 | Do. 4 p.c. Red. Deb. . . | 70—73 | .. | .. |
| 450 000 | ,, | ,, | 5 | 5 | Do. 5 p.c. Red. Deb. . . | 90—93 | .. | .. |
| 100,000 | ,, | June 26 | 5 | 5 | Cambridge 5 p.c. Deb. . . | 93—96 | .. | .. |
| 100,000 | 10 | May 22 | 6 | 10 | Cape Town, Ltd. . . . . | 9—10 | .. | .. |
| 100,000 | 10 | Apl. 24 | 4½ | 4½ | Do. 4½ p.c. Pref. . . | 6½—7½ | .. | .. |
| 150,000 | Stk. | June 26 | 4½ | 4½ | Do. 4½ p.c. Deb. . . | 69—74 | .. | .. |
| 626,860 | ,, | July 24 | 6 | 6 | Cardiff Con. Ord. . . . . | 94—97* | −2 | .. |
| 237,860 | ,, | June 26 | 7½ | 7½ | Do. 7½ p.c. Red. Deb. . | 97—100 | .. | .. |
| 157,150 | ,, | Feb. 20 | 5 | 6½ | Chester 5 p.c. Ord. . . . . | 88—93b | .. | .. |
| 98,936 | 1 | May 8 | †2/- | †2/- | Colombo, Ltd. Ord. . . . | 33/—35/- | .. | .. |
| 24,500 | 1 | ,, | 1/4½ | 1/4½ | Do. 7 p.c. Pref. . . | 18/6—20/6 | .. | .. |
| 375,402 | 1 | Apl. 3 | 1/9⅝ | 1/9⅝ | Colonial Gas Assn. Ld. Ord | 17/—19/- | −1/- | 17/—17/3 |
| 187,848 | 1 | ,, | 1/7½ | 1/7½ | Do. 8 p.c. Pref. | 19/—21/- | .. | .. |
| 2,073,280 | Stk. | July 24 | 7 | 6 | Commercial Ord. . . . . | 92—95* | −2 | 94½—96½ |
| 475,000 | ,, | June 26 | 3 | 3 | Do. 3 p.c. Deb. . . | 56—59 | .. | 56 |
| 787,560 | ,, | Feb. 20 | 7 | 7 | Croydon sliding scale . . | 105—108 | .. | .. |
| 453,100 | ,, | ,, | 5 | 5 | Do. max. div. . . . | 83—86 | .. | .. |
| 542,270 | ,, | Mar. 6 | 7 | 10 | Derby Con. . . . . | 115—125e | .. | .. |
| 55,000 | ,, | June 26 | 4 | 4 | Do. Deb. . . . . | 65—70e | .. | .. |
| 209,000 | ,, | Mar. 6 | 5 | 5 | East Hull Ord. 5 p.c. . . . | 71—73 | .. | .. |
| 1,002,180 | ,, | Mar. 20 | †7g | †7g | European, Ltd. . . . . | 110—120 | .. | .. |
| 18,629,125 | ,, | July 24 | 5⅝ | 5⅝ | Gas Light & Coke 4 p.c. Ord. | 18/9—19/3f* | −/4½ | 18/9—19/6 |
| 2,600,000 | ,, | ,, | 3½ | 3½ | Do. 3½ p.c. max. . . . | 62—64* | −1½ | 64½ 64½ |
| 4,157,020 | ,, | ,, | 4 | 4 | Do. 4 p.c. Con. Pref. . . | 76—79* | −1 | 77—79½ |
| 5,602,620 | ,, | June 26 | 3 | 3 | Do. 3 p.c. Con. Deb. . . | 58—61 | .. | 59½ - 60 |
| 3,642,770 | ,, | ,, | 5 | 5 | Do. 5 p.c. Red. Deb. . . | 97—100 | .. | 98½—100 |
| 161,400 | ,, | Feb. 20 | 10 | 10 | Harrogate Cons. 10 p.c. max. | 158—163 | .. | .. |
| 82,500 | ,, | Mar. 20 | 7 | 7 | Hastings & St. L. 5 p.c. Conv. | 99—104 | .. | .. |
| 258,740 | ,, | ,, | 5½ | 5½ | Do. 3½ p.c. Conv. | 78—83 | .. | .. |
| 70,000 | 10 | May 22 | †10 | § | Hongkong & China, Ltd. . | 13½—14½ | .. | .. |
| 213,200 | Stk. | Mar. 6 | 6 | 6 | Hornsey Con. 3½ p.c. . . . | 90—93 | .. | .. |
| 2,436,594 | ,, | May 22 | 10 | 25 | Imperial Continental Cap. . | 340—360 | .. | 342—354 |
| 223,130 | ,, | Feb. 6 | 3½ | 3½ | Do. 3½ p.c. Red. Deb. | 50—85 | .. | .. |
| 235,242 | ,, | Mar. 20 | 8½ | 8½ | Lea Bridge 5 p.c. Ord. . . | 123—128 | .. | 124½—125½ |
| 2,145,907 | ,, | Feb. 20 | 6 | 6 | Liverpool 5 p.c. Ord. . . . | 92⅝—93⅜b | +⅜ | .. |
| 600,000 | ,, | Mar. 20 | 7 | 7 | Do. 7 p.c. Red. Pref. . . | 100—102b | .. | .. |
| 165,786 | ,, | Feb. 20 | 9 | 8 | Maidstone 5 p.c. Cap. . . | 119—124 | .. | .. |
| 63,480 | ,, | June 26 | 3 | 3 | Do. 3 p.c. Deb. . . | 51—54 | .. | .. |
| 75,000 | 5 | June 26 | †10 | †10 | Malta & Mediterranean . . | 5½—6 | .. | .. |
| 392,000 | — | Apl. 1 | 5½ | 5½ | Metrop'itan (of Melbourne) 5½ p.c. Red. Deb. . . . | 90—93 | .. | .. |
| 541,920 | Stk. | May 22 | †6 | †8 | Montevideo, Ltd. . . . . | 105—110 | .. | 105½—108½ |
| 2,061,315 | ,, | July 24 | 5⅜ | 5 | Newcastle & Gateshead Con. | 15/6—16/3d/* | −/6 | .. |
| 682,856 | ,, | ,, | 4 | 4 | Do. 4 p.c. Pref. . | 70½—71½d* | −1½ | .. |
| 691,705 | ,, | Dec. 19 | 3½ | 3½ | Do. 3½ p.c. Deb. . | 66⅜—67⅜d | .. | .. |
| 169,940 | ,, | Mar. 6 | 7½ | 7½ | North Middlesex 6 p.c. Con. | 109—114 | .. | .. |
| 396,160 | ,, | Feb. 6 | 5 | 5 | Northampton 5 p.c. max. . | 75—78 | .. | .. |
| 300,000 | ,, | Apl. 24 | 9 | 7 | Oriental, Ltd. . . . . | 108—113 | .. | .. |
| 60,000 | 5 | 13 My., '15 | — | — | Ottoman . . . . . | 0—¼ | .. | .. |
| 205,162 | Stk. | June 26 | 8 | 8 | Plym'th & Stonehouse 5 p.c. | 105—108 | .. | .. |
| 424,416 | ,, | Feb. 20 | 8 | 8 | Portsm'th Con. Stk. 4 p.c. Std | 110—115 | .. | .. |
| 241,446 | ,, | ,, | 5 | 5 | Do. 5 p.c. max. . . | 78—81 | .. | .. |
| 186,000 | 100 | June 2 | 4 | 4 | Primitiva 4 p.c. Red. Deb. . | 96—99 | .. | • .. |
| 677,837 | Stk. | July 24 | 4 | 4 | Do. 4 p.c. Red. Deb. 1911 | 79—82* | −2 | .. |
| 371,496 | ,, | June 26 | 4 | 4 | Do. 4 p.c. Cons. Deb. . | 80—83 | .. | 82½—83 |
| 150,000 | 10 | Apl. 3 | 6 | 6 | San Paulo 6 p.c. Pref. . . | 8½—9 | .. | .. |
| 1,736,968 | Stk. | Mar. 20 | 6½ | 6½ | Sheffield Cons. . . . . | 103—105e | .. | .. |
| 95,000 | ,, | July 10 | 4 | 4 | Do. 4 p.c. Deb. . . . . | 76—78e | .. | .. |
| 90,000 | 10 | June 5 | †4 | ‡5 | South African . . . . . | 4—6 | .. | .. |
| 6,709,895 | Stk. | Feb. 20 | 5 | 7½ | South Met. Ord. . . . . | 102—104 | .. | 102½—103½ |
| 500,000 | ,, | ,, | 6 | 6 | Do. 6 p.c. Irred. Pf. | 108—111 | .. | .. |
| 1,895,445 | ,, | July 10 | 3 | 3 | Do. 3 p.c. Deb. . . | 57—60 | .. | 59—59½ |
| 734,000 | ,, | Mar. 6 | 6½ | 6½ | Do. 6½ p.c. Red. Db. | 99—101 | .. | 100—100½ |
| 91,500 | ,, | Mar. 20 | 8½ | 8½ | South Shields Con. . . . | 106⅜—107⅝ | +⅛ | .. |
| 1,543,795 | ,, | July 24 | 6½ | 6½ | South Suburban Ord. 5 p.c. | 99—102* | −2 | 102½—103½ |
| 468,837 | ,, | June 26 | 5 | 5 | Do. 5 p.c. Deb. | 93—96 | .. | .. |
| 647,740 | ,, | Feb. 20 | 5 | 5 | Southampton Ord. 5 p.c.max. | 76—79 | .. | .. |
| 121,375 | ,, | June 26 | 4 | 4 | Do. 4 p.c. Deb. | 71—74 | .. | .. |
| 179,014 | ,, | July 24 | 8 | 8 | Sutton Ord. . . . . | 110—113* | −3 | .. |
| 67,828 | ,, | June 26 | 5 | 5 | Do. 5 p.c. Deb. . . | 93—96 | .. | .. |
| 250,000 | ,, | Mar. 6 | 7 | 7 | Swansea 7 p.c. Red. Pref. . | 98—101 | .. | .. |
| 200,000 | ,, | June 26 | 6½ | 6½ | Do. 6½ p.c. Red. Deb. . | 98—101 | .. | .. |
| 1,076,490 | ,, | July 24 | 6⅝ | 6⅝ | Tottenham District Ord. . | 100—104* | −2 | 100½—104½ |
| 150,000 | ,, | ,, | 5⅝ | 5⅝ | Do. 5½ p.c. Pref. . . | 95—98* | −2 | 96 |
| 199,005 | ,, | June 26 | 4 | 4 | Do. 4 p.c. Deb. . . | 73—76 | .. | .. |
| 182,380 | 10 | 30 Dec., '12 | — | — | Tuscan, Ltd. . . . . | 3⅜—4⅜ | .. | .. |
| 85,701 | Stk. | Mar. 20 | 6 | 6 | Do. 6 p.c. Red. Deb. | 75—80 | .. | .. |
| 809,094 | ,, | Mar. 6 | 7 | 7 | Uxbridge, Maidenhead, & Wycombe 5 p.c. . . . | 94—99 | .. | .. |
| 88,330 | ,, | ,, | 5 | 5 | Do. 5 p.c. pref. . . | 85—90 | .. | .. |
| 1,180,970 | ,, | July 10 | — | 7 | Wandsworth, Wimbledon, and Epsom Cons. . . | 107—112 | +2 | 108—110½ |
| 200,000 | ,, | ,, | 5 | 5 | Do. 5 p.c. Pref. . . . | 87—90 | .. | 88 |
| 488,344 | ,, | June 26 | 5 | 5 | Do. 5 p.c. Deb. . . . | 93—96 | .. | 95½ |

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *f.*—The quotation is per £1 of Stock. *g.*—Paid on £10 shares. * Ex. div. † Paid free of income-tax. ‡ For year. § Div=10 p.ct. p.a. less tax and less tax on interim dividend.

GENERAL IMMERSION
Indirect Water Heater

Unique and Different

Adoption means Progress

THE SECRET OF A CHEAP & ABUNDANT SUPPLY of HOT WATER

LOW INITIAL COST
LOW INSTALLATION COST
MINIMUM GAS CONSUMPTION
NEGLIGIBLE MAINTENANCE COSTS
NO DISCOLORATION OF WATER
NO CORROSION OF INTERNAL FLUES
NO CONDENSATION
NO DEPOSITS IN FLUES OR BOILER
WORKS INDEPENDENTLY OR IN CONJUNCTION WITH THE RANGE BOILER

GENERAL GAS APPLIANCES LIMITED
Guide Bridge Manchester

# INDEX TO "JOURNAL" ADVERTISERS.


| | PAGE |
|---|---|
| Aerograph Co., Ltd. | — |
| Alder & Mackay, Ltd. | Wrapper I., 239 |
| Aldridge & Ranken, Ltd. | 241 |
| Allan, Thomas, & Sons, Ltd. | 270 |
| Anglo-American Oil Company, Ltd. | 275 |
| Arden Hill & Co. | — |
| Armco International Corporation. | — |
| Asbestos Cement Building Products, Ltd. | — |
| Ashmore, Benson, Pease, & Co., Ltd. | Wrapper I. |
| Ashwell & Nesbit, Ltd. | — |
| Bagnall, John, & Sons, Ltd. | — |
| Bagshawe & Co., Ltd. | 229 |
| Bale & Church, Ltd. | 267 |
| Barclay, Andrew, Sons, & Co., Ltd. | 234 |
| Barrowfield Ironworks, Ltd. | — |
| Bell's Poilite & Everite Co., Ltd. | — |
| Berk, F. W., & Co., Ltd. | Wrapper I. |
| Blakeley (Firth), Sons, & Co., Ltd. | 268, 270 |
| Braddock, J. & J. | Centre VIII., 267 |
| Bray, George, & Co., Ltd. | — |
| British Aluminium Co., Ltd. | — |
| British Fibrocement Works, Ltd. | — |
| British Furnaces, Ltd. | 236 |
| British Gas Purifying Materials Co. | 267 |
| British Industries Fair | 238 |
| British Thomson-Houston Co., Ltd. | — |
| Broadbent, Thos., & Son, Ltd. | — |
| Broadhead Constructions, Ltd. | — |
| Bugden, T., & Co. | — |
| Cambridge Instrument Co., Ltd. | Centre VIII. |
| Cannon Iron Foundries, Ltd. | — |
| Carron Company | — |
| Cellactite & British Uralite, Ltd. | — |
| Chapman (Spencer) & Messel, Ltd. | 267 |
| Chemical Engineering and Wilton's Patent Furnace Co., Ltd. | — |
| Clapham Bros., Ltd. | — |
| Clayton, Son, & Co., Ltd. | — |
| Cloake, A. G. | Centre VII. |
| Coleman Foundry Equipment Co. | — |
| Colthrop Board & Paper Mills, Ltd. | 271 |
| Cort, Robert, & Son, Ltd. | 232 |
| Cowan, W. & B. | Wrapper III. |
| Crossley Bros. (Bispham) | — |
| Crossley Brothers, Ltd. (Openshaw) | — |
| Cutler, Samuel, & Sons, Ltd. | Centre XI. |
| Dampney, J., & Co., Ltd. | — |
| Danks, H. & T. (Netherton), Ltd. | 267 |
| Davis Gas Stove Co., Ltd. | — |
| Davison & Partner, Ltd. | — |
| Dempster, R. & J., Ltd. | Wrapper I. |
| Dempster, R., & Sons., Ltd. | Centre II., 268 |
| Donkin Co., Ltd. (The Bryan) | Wrapper II. |
| Dougall's Gas Meters, Ltd | — |
| Drakes, Ltd. | — |
| Drayton Regulator and Instrument Co., Ltd. | — |
| Dry Gasholders, Ltd. | — |
| Duckham, Alexander, & Co., Ltd. | — |
| Duxbury, Thomas, & Co. | 267 |
| Eagle Range and Grate Co. | — |
| Economic Gas Boiler Co., Ltd. | 233 |
| Economical Gas Apparatus Construction Company, Ltd. | — |
| Eden Fisher & Co., Ltd. | — |
| Ellis, Key, & Co. | — |
| Evans, Joseph, & Son (Wolverhampton), Ltd. | 275 |
| Expanded Metal Company, Ltd. | — |
| Falk, Stadelmann, & Co., Ltd. | — |
| Fletcher, Russell, & Co., Ltd. | — |
| Foster & Pullen, Ltd. | 277 |
| Foster Bros., Ltd. | — |
| Fraser & Chalmers Engineering Works | — |
| Gas Chambers and Coke Ovens, Ltd. | 231 |
| Gas Meter Co., Ltd. | Wrapper IV., 230 |
| Gas Purification and Chemical Co. | Wrapper I., 267 |
| General Gas Appliances, Ltd. | 265 |
| General Refractories, Ltd. | — |
| Gibbons Bros., Ltd. | — |
| Gibbons (Dudley), Ltd. | — |
| Gledhill-Brook Time Recorders | — |
| Glenboig Union Fireclay Co., Ltd. | 271 |
| Glover, George, & Co., Ltd. | 227 |
| Glover, Thos., & Co., Ltd. | 242 |
| Goodall, Clayton, & Co., Lt | Centre VII. |
| Grant, David, & Co. | 277 |
| Green & Boulding, Ltd. | 270 |
| Griffin & Tatlock, Ltd. | — |
| Griffiths Bros. & Co. (London), Ltd. | Wrapper I. |
| Hall, John, & Co., Stourbridge, Ltd. | 273 |
| Hardtmuth, L. & C. | — |
| Harris & Pearson | 270 |
| Head, Wrightson, & Co., Ltd. | — |
| Heathman, J. H. | — |
| Hislop, R. & G. | 275 |
| Holmes, W. C., & Co., Ltd. | Wrapper I., 269 |
| Holst, K., & Co. | — |
| Horseley Bridge and Engineering Company, Ltd. | Wrapper II. |
| Horstmann Gear Company, Ltd | — |
| Hortonspheres | — |
| Humphreys & Glasgow, Ltd. | 240 |
| Hurry Water Heater Co. | 237 |
| Hutchinson Bros., Ltd. | — |
| Institute of Chemistry | — |
| Jenkins, W. J., & Co., Ltd. | — |
| Kaye, Joseph, & Sons, Ltd. | — |
| Keith, James, & Blackman Company, Ltd. | 278 |
| Kent, George, Ltd. | — |
| King, Walter, Ltd. | 268 |
| King's Patent Agency | — |
| Kinnell, Chas. P., & Co., Ltd. | 233 |
| Kirkham, Hulett, & Chandler, Ltd. | — |
| Kleenoff Co. | 267 |
| Koppers Coke Oven Co., Ltd. | 270 |
| Laidlaw, R., & Son (Edin.), Ltd. | 276 |
| Le Bas Tube Co., Ltd. | 236 |
| Lead Wool Company, Ltd. | — |
| Lighting Trades Ltd. | — |
| London Electric Firm, The | — |
| London Gas Exhibit | — |
| Macpherson, Donald, & Co., Ltd. | — |
| Main, R. & A., Ltd. | Centre IX. |
| Manchester Oxide Co., Ltd. | 267 |
| McKelvie, James, & Co. | Wrapper I. |
| Metropolitan Vickers Electrical Co., Ltd. | 236 |
| Mewburn, Ellis, & Co. | 267 |
| Midland Flexible Metallic Tubing Co., Ltd. | — |
| Mitchell, H., & Co. | — |
| Mobberley & Perry, Ltd. | — |
| Moler Products, Ltd. | — |
| New Conveyor Co., Ltd. | 272 |
| Newton Chambers & Co., Ltd. | Centre VI. |
| Orme, George, & Co. | — |
| Oughtibridge Silica Firebrick Co. | 239 |
| Parkinson Stove Co., Ltd. | Centre III. |
| Parkinson, W., & Co. | 230, 242, 274 |
| Patent Retorts, Ltd. | 273 |
| Pearn, Frank, & Co., Ltd | — |
| Pearson, E. J. & J., Ltd. | — |
| Peckett & Sons, Ltd. | 273 |
| Peebles & Co., Ltd. | — |
| Penney & Porter, Ltd. | — |
| Perfecta Meters, Ltd. | — |
| Phillips, J. W. & C. J., Ltd. | 270 |
| Piggott, Thos., & Co., Ltd. | — |
| Pneumatic Conveyance and Extraction (1929), Ltd. | — |
| Pocock, Herbert | — |
| Potterton, T. (Heating Engineers), Ltd. | — |
| Premier Gas Engine Co., Ltd. | — |
| Progas Co., Ltd. | — |
| Pulsometer Engineering Company | Wrapper IV |
| Purimachos Ltd. | — |
| Quasi-Arc Co., Ltd. | — |
| Radiation Ltd. | Centre IV., V., 235 |
| Raschig, Dr. F., G.m.b.H. | — |
| Reavell & Co., Ltd. | 276 |
| Renold, Hans, Ltd. | — |
| Richmonds Gas Stove Co., Ltd. | — |
| Riley, A. J., & Sons, Ltd. | — |
| Riley, John, & Sons, Ltd. | — |
| Robinson, J. H., & Co. (L'pool), Ltd. | 234 |
| Ross, Chas., Ltd. | 267 |
| Rotary Meter Company, Ltd. | — |
| Rotherham and District Collieries Association, Ltd. | Wrapper IV. |
| Ruscoe, John, & Co., Ltd. | — |
| Sawer & Purves | Centre XI. |
| Scottish Tube Co., Ltd. | 273 |
| Sheepbridge Coal and Iron Co., Ltd | — |
| Siebe, Gorman, & Co., Ltd. | 275 |
| Simon-Carves, Ltd. | — |
| Smith Meters, Ltd. | — |
| Solent Engineering Co., Ltd | Wrapper IV. |
| South Metropolitan Gas Company | 272 |
| Spencer-Bonecourt, Ltd. | — |
| Spencer Chapman & Messel, Ltd. | 267 |
| Stanton Ironworks Co., Ltd. | Centre X. |
| Staveley Coal and Iron Co., Ltd. | — |
| Stein, J. G., & Co., Ltd. | Wrapper I. |
| Stewarts and Lloyds, Ltd. | Wrapper I. |
| Strachan & Henshaw, Ltd. | 227 |
| Stringer Bros. | — |
| Sugg, Wm., & Co., Ltd. | — |
| Super-Centrifugal Engineers, Ltd. | — |
| Sweet & Maxwell, Ltd. | 270 |
| Taylor, Joseph (Saturators), Ltd. | — |
| Thames Bank Iron Co., Ltd. | — |
| Thompson, J. (Wolverhampton), Ltd | — |
| Tilghman's Patent Sand Blast Co. | — |
| Tilley Bros., Ltd. | — |
| Torbay Paint Company, Ltd. | Wrapper I. |
| Trier Bros., Ltd. | — |
| Trotter, Haines, and Corbett, Ltd. | 270 |
| Tully Sons & Co., Ltd. | 276 |
| Turner Brothers Asbestos Co., Ltd. | — |
| Turner, F. (Art Metal), Ltd. | — |
| Vertical Gas Retort Synd., Ltd. | 277 |
| Vickery, J. H., & Co., Ltd. | — |
| Wailes Dove Bitumastic, Ltd. | — |
| Walker, C. & W., Ltd. | Centre VII. |
| Waller, Geo., & Son, Ltd. | 228 |
| Walworth, Ltd. | — |
| Waterless Gasholder Co., Ltd. | — |
| Wellington Tube Works, Ltd. | — |
| Welsbach Light Company, Ltd. | — |
| West's Gas Improvement Co. | Centre XII. |
| Westwood & Wrights | — |
| Whessoe Foundry and Eng. Co., Ltd. | — |
| Wholesale Fittings Co., Ltd. | — |
| Willey & Co., Ltd. | — |
| Williamson, Cliff, Ltd. | — |
| Willmott, A. R., & Co. | — |
| Wilson (George) Gas Meters, Ltd. | 267 |
| Wilsons & Mathiesons, Ltd. | — |
| Winn, Paul, & Co., Ltd. | — |
| Woodall-Duckham Co., Ltd. | Centre I. |
| Woolley, James, Sons & Co., Ltd. | — |
| Wright, Alex., and Co., Ltd. | 263 |
| Wright, John, & Co. | 235 |


---


| | |
|---|---|
| Appointments Vacant and Wanted | 267, 268, 270 |
| Company Notices | 270 |
| Contracts Open | — |
| Educational | — |
| Gas-Works for Sale | — |
| Patent Notices, &c. | 270 |
| Plant, &c., for Sale and Wanted | 270 |
| Stock Issues | — |

# CONTENTS


### EDITORIAL NOTES.

A GLANCE AT THE CONTENTS . . 295
The Ever-Needed Lesson . . . . . 296
Leakage . . . . . 296
Methods of Charge . . . . . 296
Smoothing the Path of the Consumer . . . 297
Making Gas History . . . . . 297
The Unprotected Shareholder—Voluntary Daylight Saving—Another Two-Part Tariff Recruit—Profit-Sharing Schemes Analyzed—A Reasoned Review—The Beauty of a Gasholder—Humanity in Industry—Develop Personality . . . . . 298

Personal . . . . . 299
Obituary . . . . . 299
Forthcoming Engagements . . . . . 299

### CORRESPONDENCE.

Correspondence Classes . . . . . 299
Gas Fire Campaign . . . . . 299
Recovery of Ammonia Chloride . . . . 300
Waterless Holders . . . . . 300

### THE NEWS OF THE WEEK.

Bewdley Town Council—Fleetwood Gas Company—Bradford Corporation Gas Department—Hull Corporation and the East Hull Gas Company—Mr. A. R. Bisset—Gloucester Gas Light Company's New Showrooms—Steady Growth of Co-Partnership—Cost of Production at Port Talbot—York Councillors and the Gas Company—Centenary of Gas at Penrith—Increase in Price at Stafford . . . . . 301
C.W.G. Plant Inaugurated at Hastings . . 301
Gas for Motive Power Purposes . . . . 301
British Benzol and Coal Distillation . . . 302
Notes from Scotland . . . . . 302
Corporation Undertakings' Results . . . 302

Two-Part Charging: Policy and Practice . 303
Industrial Effluent. By Leslie F. Stemp . 305
The Rhine and Westphalia. By M. Barash, M.Sc. (Tech.), F.I.C. . . . . 306
Holder Wrecked at Keighley . . . . . 307

### THE "JOURNAL" TECHNICAL RECORD.

The Fifty-Third Congress of the French Gas Industry . . . . . 308
Wire Baking by Gas. By O. L. Maddux . 309
American Gas Association's Pipe Joint Research Programme. By R. M. Conner . 310

South Metropolitan Gas Company—Alliance with the Commercial Gas Company . . 312
Commercial Gas Company—Agreement with the South Metropolitan Gas Company Unanimously Approved . . . . . 313
Croydon and East Surrey Gas Order . . . 314

### REGISTER OF PATENTS.

Apparatus for Metering Gas—Humphreys & Glasgow, Ltd. . . . . 316
Skip Hoists—Humphreys & Glasgow, Ltd., and Fryer, J. E. G. . . . . 317
Applications for Patents . . . . . 317

### GAS MARKETS AND MANUFACTURES.

Stock Market Report . . . . . 317
Coal Markets . . . . . 317
Trade Notes . . . . . 317
Current Sales of Gas Products . . . . . 318
Contracts Advertised To-Day . . . . . 318
Overseas Opportunities . . . . . 318

### LEGAL INTELLIGENCE.

Trouble Over the Plans of a Gasholder . . 318
Winding-Up of Pontardulais Gas Company . 318

Metropolitan Gas Companies' Testings . . 318
Stock and Share List . . . . . 319


"JOURNAL" Telephone: Central 6055

For Advertisers' Index—see p. 320.

GENERAL IMMERSION Indirect Water Heater

LOW INITIAL COST
LOW INSTALLATION COST
MINIMUM GAS CONSUMPTION
NEGLIGIBLE MAINTENANCE COSTS
NO DISCOLORATION OF WATER
NO CORROSION OF INTERNAL FLUES
NO CONDENSATION
NO DEPOSITS IN FLUES OR BOILER
WORKS INDEPENDENTLY OR IN CONJUNCTION WITH THE RANGE BOILER

GENERAL GAS APPLIANCES LIMITED
Guide Bridge Manchester

THE SECRET OF A CHEAP & ABUNDANT SUPPLY of HOT WATER

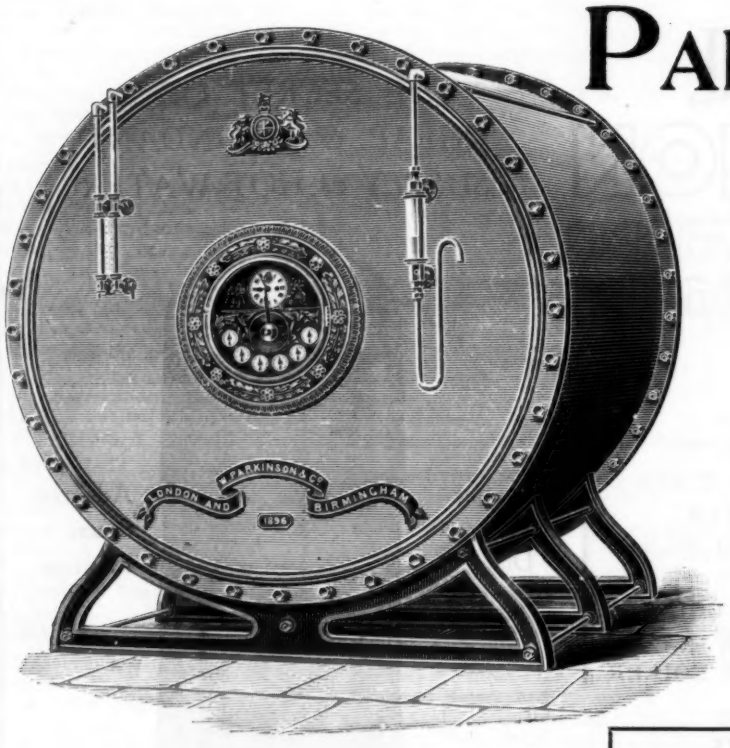
Unique and Different

Adoption means Progress

BRITISH BUILT TO LAST

Made of the finest British materials and with the most expert British craftsmanship, the Thomas Glover meter lasts because it is British built to last. You are always safe in choosing the Thomas Glover Meter.

THOMAS GLOVER METERS




PARKINSON'S

CYLINDRICAL METERS.

Tracings, Specifications, and Prices, on application ——

W. PARKINSON & CO.,

INCORPORATED IN PARKINSON & COWAN (GAS METERS), LTD.

COTTAGE LANE, CITY ROAD, LONDON, E.C.1.
*Telegrams:* "INDEX, 'PHONE, LONDON."
*'Phone Nos.:* 4270 Clerkenwell

BELL BARN ROAD, BIRMINGHAM.
"GASMETERS, B'HAM."
2245 Midland, B'ham.

RAPHAEL STREET, CROMAC STREET, BELFAST.
"PREPAYMENT, BELFAST."
3374 Belfast.